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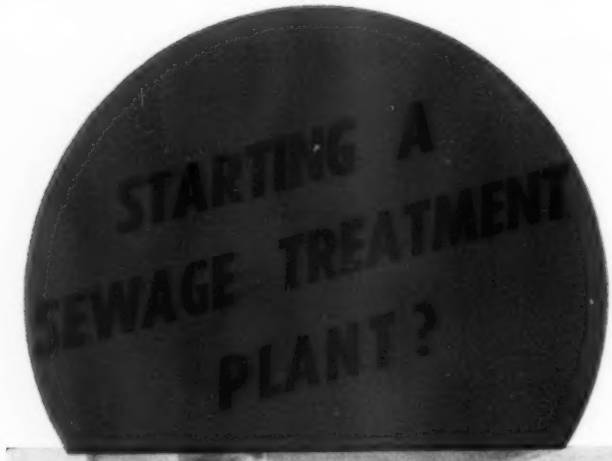
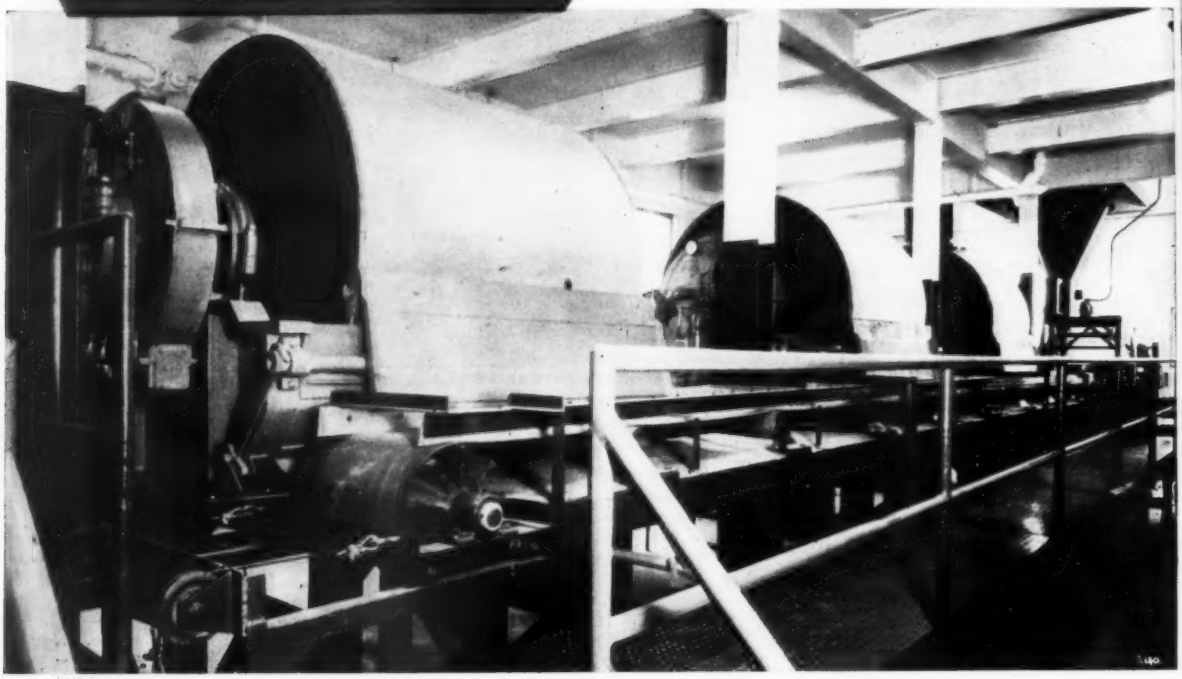
THE MUNICIPAL INDEX AND ATLAS, used in connection with the current advertisements in THE AMERICAN CITY, places local officials in the most favorable position to obtain all types of available equipment and supplies from manufacturers who desire to serve municipal government departments. This 750-page annual is published by The American City Magazine Corporation, 470 Fourth Avenue, New York 16, N. Y.

See pp. 21, 23, 24, 26, 27, 30, 171, 173, 175, 177 for catalogs and publications on municipal and civic subjects

List of coming conventions, page 169. **Index to Advertisements, page 214.**



INSIST ON EIMCO VACUUM FILTERS FOR SLUDGE DEWATERING



Engineers planning new sewage treatment plants or remodeling old plants have found that the numerous benefits of vacuum filters for dewatering sludge make it profitable to incorporate continuous vacuum filters in the plans.

Eimco vacuum filters require about one third of one percent as much space as is required by sand drying beds. Fly and other insect hazards are eliminated by using vacuum filters. Provision for future growth of the city can be made by leaving space for an additional filter unit when needed.

The vacuum filter operates in all kinds of weather, dewaters the sludge from any type of sewage treatment and requires very little if any supervision and maintenance. In addition to these advantages, the original cost of the Eimco vacuum sludge filter is no more than the sludge beds.

Write for more information on Eimco Continuous Vacuum Filters for dewatering sewage sludge or call an Eimco Engineer for consultation without obligation.

EIMCO

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Executive Offices and Factories — Salt Lake City 8, Utah: Branches — 67 Wall St., New York 5 — 3319 So. Wallace, St., Chicago 16—Mills Bldg., El Paso—1217 - 7th St., Sacramento 14

Our Municipal Notebook

Too Much from Big Cities?

THERE are only fourteen cities in the United States of over half a million population; but more than five thousand municipalities of smaller size are represented on THE AMERICAN CITY's mailing list with from one to ten or more subscriptions each.

This suggests the question—to which the editors give frequent serious thought—of whether the big cities are accorded an undue proportion of space in the pages of this magazine.

In the June issue, for example, there were articles dealing with various phases of municipal activities in New York, Washington, San Francisco, New Orleans, Detroit, and London (England). These were outbalanced in number, however, by articles from smaller places such as Attleboro, Mass.; Mount Union, Pa.; Burlington, N. C.; Johnson City, Tenn.; Hopkins, Minn.; Winston-Salem, N. C.; Stamford, Conn., and Winchester, Va. There were also numerous items and discussions of problems common to municipalities generally, not restricted to any one city.

Occasionally a large-city article is accepted for publication in this magazine because the spectacular character of the improvement is believed to be of general interest, aside from its applicability to smaller places. But in general, the criterion of an article is the adaptability of the ideas—in modified forms, perhaps—to communities of less than metropolitan size.

In the present issue, to cite only two examples, the story of Milwaukee's intensive chest x-ray survey and the item on New York's new sanitary code for swimming pools and bathing beaches offer practical hints for smaller communities. And it works, too, the other way around; the ideas, for instance, that are being developed in the villages of Tarrytown and North Tarrytown for the observance of "United Nations Week" might well be put into effect by many a larger community.

National Institute of City and Town Clerks Formed

THE first annual meeting of the National Institute of City and Town Clerks was held the last week in May at French Lick Springs, Ind.

The constitution of the newly formed Institute calls for the cooperation of local government clerks, recorders, and secretaries in the practical study of all municipal questions falling within their jurisdiction; the holding of meetings for the discussion of current city and town problems; the furnishing of information to these officials to help them perform their municipal functions better; the safeguarding of the interests, rights, and privileges of municipalities as they may be affected by legislation.

Officers and trustees for the ensuing year elected at French Lick Springs—all city clerks of their respective cities—are as follows: President, John J. Coffey, Buffalo, N. Y.; First Vice-president, L. D. James, Roanoke, Va.; Second Vice-president, Arthur J. Shinners, Brookline, Mass.; Third Vice-president, Philip P. Costello, Perth Amboy, N. J.; trustees, Walter A. Klein, Milwaukee, Wis.; Ruth C. Kemp, Berkeley, Calif.; J. L. Richardson, Atlanta, Ga.; Earle M. Simon, Oklahoma City, Okla.

Paul V. Betters, Executive Director of the United States Conference of Mayors, is serving temporarily as Acting Executive Director of the Institute, at 730 Jackson Place, Washington, D. C.

*United Nations Week September 14-20, 1947**

A suggested PROCLAMATION by the Mayor

***Whereas*, the second annual observance of United Nations Week will take place from September 14 to 20, coinciding with the opening of the 1947 General Assembly, and**

***Whereas*, one of the essentials for building up a successful United Nations and accomplishing universal peace is the support of a well-informed public opinion, and**

***Whereas*, the theme adopted for the celebration for this year is "The Individual's Responsibility in the United Nations";**

NOW, THEREFORE, I, ——— ———, Mayor of ———, do hereby proclaim September 14 to 20 as United Nations Week in the City of ———, and I urge all civic, welfare, religious, and business organizations to cooperate in helping to enlighten our citizenry by emphasizing the importance of individual cooperation and participation in the United Nations.

* See page 108 of this issue.

What About War Surplus Sales?

SOME way or another war assets sales have not measured up to the expectations of our cities. Buyers from municipalities have seen hard-to-get copper pipe, for example, declared not surplus and then later show up for sale through some broker. They have seen pipe that they wanted lumped with other material and thus become unavailable. They have been annoyed by the difficulty of inspecting what they wanted to buy, and particularly disturbed over the lack of any kind of guarantee. Annoying, too, has been the occasional indifferent attitude of the War Assets Authorities who did not want to be bothered by making a sale.

Much of this is understandable. If WAA is so poorly organized that its personnel actually discourage sales to municipalities, this certainly should be corrected. But perhaps the fault is not entirely with the government.

For years our municipalities have had the benefit of manufacturers' representatives who are skilled and expert engineers. When a city has wanted to build a street improvement, it has not hesitated to ask for and get expert advice on mixes, design, and general procedure. When studying a water or sewer improvement, it again has not hesitated to ask manufacturers' representatives for advice and technical assistance and get it from some of the finest and best-informed engineers in the country.

They get it because these manufacturers want to stay in business. They want the municipalities to be continuing customers and to have confidence in their product.

Improved Sanitary Code for Public Pools and Beaches

THE Board of Health of New York City adopted, on May 13, a complete revision of its Sanitary Code governing the regulation of bathing establishments.*

These changes were made in line with a program which has been in operation for several years to improve the sanitary and safety conditions of public pools and beaches. The amendments are more complete than the

* A copy of the revised regulations (Section 340 of the Sanitary Code) may be had without charge on application to the Board Clerk, Board of Health, 125 Worth Street, New York 13.

MELTING SCRAP LEAD from discarded telephone cable. It is smelted and refined at a Western Electric plant for reuse as cable sheathing.

He's cooking up telephone service

The salvaging of worn-out equipment has always been important in the telephone business. It's more important than ever right now.

For it isn't just so many pounds or tons of lead and copper and zinc and steel that come out of it. It's telephone service.

Every bit of recovered material helps to relieve shortages and enables us to build more of the telephone equipment that is so urgently needed.

That means better, quicker service for everyone. It also brings telephone service nearer to those who may have been waiting for a long time.

So salvaging is more than salvaging these days.

It's the voice of a friend. A hurry-call to the doctor. A visit with someone in a distant city. Somebody's link with everything and everybody, everywhere.

BELL TELEPHONE SYSTEM

former sections of the code, set up specific standards where no previous standards existed, and make possible more uniform and effective enforcement.

As a result of the voluntary program in operation for the past several years, the majority of public swimming pools and beaches already conform to the new regulations.

Among the new provisions designed to improve sanitary and safety conditions are:

1. Plans for construction and design of bathing establishments must be approved by the Health Department.

2. Specific bacteriological, chemical, and physical standards of water cleanliness are established. Measures to prevent sewage contamination, dirt, sediment are required.

3. Adequate lighting, proper ventilation, to conform with article 5 of the city building code, are required.

4. Operating records must be kept and sent to Health Department monthly. These records include such data as when water is changed, when water is added, chlorine used, number of persons using pool, etc.

5. Regulations on washing suits and towels to meet approval of Health Department are tightened.

6. Regulations on toilets, dressing rooms, showers, maintenance, etc., are made more specific.

Survey of Public Purchasing Practices Under Way

TO increase the efficiency of purchasing by municipalities and other units of government, a large-scale survey of public purchasing practices and procedures was begun last month by the National Institute of Governmental Purchasing. Detailed questionnaires have been mailed to 750 public purchasing agents at all levels of government throughout the country.

For a long time, we have known that purchasing practices in public agencies vary widely (said Albert Pleydell, President of the Institute and former Commissioner of Purchasing of the City of New York). The variations in practices have not only caused great difficulties for public purchasing agents but have bedeviled and confused reputable business organizations. The result of this condition has been not only that many reputable business organizations have been discouraged from bidding on public offerings, but public purchasing men have been hindered in obtaining the best competition from responsible bidders. While it is true that variations in practices are the result of legal requirements in different jurisdictions, the question arises whether there cannot be some degree of standardization in practice to buy more for the taxpayer's dollar.

The Institute's questionnaire covers a wide field of public purchasing procedures. Among the subjects listed in the questionnaire are procedures in making awards at public lettings, short order forms, contract bids, specifications, inspection and testing, qualifications of bidders, discounts, liquidated damages, payments, and warehousing.

The survey is planned to provide data for a complete report to be made at the Annual Conference of NIGP, which will be held at the Hotel Pennsylvania in New York City from September 8 to 10, 1947. At that time, Mr. David Joseph, an accountant of 40 East 49th Street, New York, the Special Survey Director, will make his report. Following discussion at the Conference, it is expected that the Institute will create a special committee to recommend action on the findings.

Fire Departments Mark Time While Cities Grow

THE shortage of fire-fighting apparatus is not generally realized. Less than 1% of all city fire equipment has been replaced in the last six years—since 1941—and 50% of all equipment is more than twenty years old. Water supplies, fire-alarm systems, and fire-codes are also in urgent need of rehabilitation or revision in a majority of cities throughout the nation.

The upward trend of fire losses began seven years ago. During the war the increase in industrial and mercantile activity, with undermanned fire departments and inability to get proper equipment to fight fire, were the reasons assigned for the increasing losses. Increased property values now make better protection even more important. The fact is that many fire departments are not so well equipped to fight all of the fires as they were from 1920 to 1939. The facilities, in terms of property values that must be protected, show that present equipment is now trying to protect twice the property, as measured in dollars and cents value, that the same equipment protected in 1939.

During the past five years, industry has expanded an estimated 250%. Many new plants have been located in the suburbs and in many instances outside of the city limits. The fire department, often with reduced man-power and less equipment, is required to serve many of these new plants and still take care of a bigger job of protecting more older plants than ever before.

Many new apartment houses have been built since 1938, without any substantial increase in fire departments to protect them—but the gravest problem has been the overcrowding of present homes. Cutting an old house up to make it into four or five apartments has been practiced in many cities, and still without any complementary increase in fire departments to take care of added property values and increased hazards to both life and property.

One answer to "What is back of increasing fire losses?" is that the same fire that occurred in 1932 in the same building, would result, if it occurred in 1947, not in $10,000 damage, but now often in $20,000 in damage, because of the increase in values.

PR, PPR, and MPR

To the Editor of THE AMERICAN CITY:

In your June issue, Henry Davis Nadig adopts a symbol for public relations which has long been preempted for another fundamental governmental device. His main heading, "A municipal PR ordeal is in process", sugggests that what follows may be a discussion of the current political attack on proportional representation in New York City.

To avoid a similar confusion, permanent-registration advocates have recently been using an extra initial—PPR for permanent personal registration. Perhaps Mr. Nadig could add an "M" and use MPR for Municipal Public Relations.*

It occurs to me that all these PR's go very well together as instruments of good government. A city is indeed fortunate if it has *permanent registration* to allow effective appeals to the whole electorate right up to election day, *proportional representation* to give a voice and share in their government to all who vote, and *public relations* to keep up the partnership between voters and officials throughout the year.

There is, in fact, a definite public relations aspect to the other PR's. When voting is made easy, as it is by permanent registration, and effective, as it is by proportional representation, a larger part of the public is likely to participate in public affairs.

And there is nothing like representation for all elements in proportion to their voting strength—the usual PR—to give everyone a sense of participation in and responsibility for the success of government. When a single political machine dominates city policies and shuts out nearly everyone who is not in its inner circle, as before the advent of PR in the New York City Board of Aldermen, which once consisted of 64 organization Democrats and Joseph Clark Baldwin, it is hard to avoid a cynical antagonism to government on the part of the public. Nothing remotely like that has ever happened under PR. Proportional representation promotes good public relations by inviting everyone to lend a hand in this greatest of cooperative enterprises, whether he allies himself with the largest political organization in his neighborhood or not.

GEORGE H. HALLETT, JR.
Secretary, New York Citizens Union

* This suggestion has been adopted by Mr. Nadig in the present issue—see page 134.

when your city needs more uniform water pressure . . . .

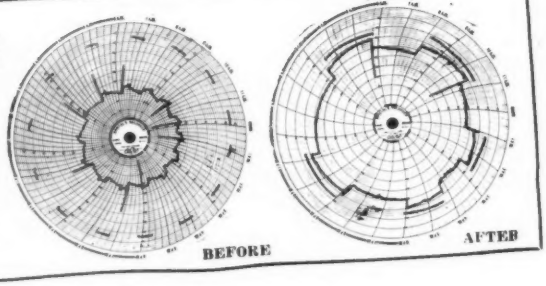
put it up to a HORTON ELEVATED TANK

In many cities elevated water storage has proved to be the determining factor in *smoothing out* pressure variations in the water distribution system. At Opelika, Alabama, for example, pressure varied from 60 lbs. to 30 lbs. prior to the erection of a 1,000,000-gal. Horton elevated tank. Since the tank was installed, pressure in the water system is *maintained* at approximately 60 lbs. per sq. in. . . . At Lockport, Ill., water pressure in a hilly area averaged only 16 lbs. per sq. in. A 200,000-gal. Horton tank was recommended and, after it was placed in service, recordings revealed that pressure increased on an average of 13 lbs., not only in the hilly area but throughout the entire system! . . . The 1,000,000-gal. Horton tank shown at the right was recently erected at Decatur, Ala. It will help provide more uniform water pressure for the 4,600 customers of that city. Reports indicate that it is not necessary to raise pressures for serious fires. Pressure at the pumping plant is maintained at approximately 60 lbs. per sq. in. . . . So it seems only natural that water works engineers and civic leaders should recommend *elevated storage* when planning improved water pressure for a city. Horton elevated storage tanks are built in capacities up to 2,000,000 gals. for municipal service. They are designed to harmonize with their surroundings and serve a city for years as a symbol of wise planning. Why not get quotations on a Horton elevated tank when planning better water service for your *city*.

The 1,000,000-gal. Horton radial-cone bottom elevated tank we recently erected for the City of Decatur, Ala., is shown above. It is 108 ft. to bottom and has a range in head of 35 ft.

TYPICAL EXAMPLE OF HOW A HORTON ELEVATED TANK CAN IMPROVE WATER PRESSURE.

These "before" and "after" charts show how a 200,000-gal. Horton elevated tank improved pressure in the Lockport, Ill., water system. Pressures increased an average of 13 lbs. per sq. in. throughout the entire system.



CHICAGO BRIDGE & IRON COMPANY

Birmingham 1.....1502 North Fiftieth St.
Houston 1.....5601 Clinton Dr.
Tulsa 3.....1625 Hunt Bldg.
New York 6.....3308—165 Broadway Bldg.
Cleveland 15.....2236 Guildhall Bldg.
Los Angeles 14.....1403 Wm. Fox Bldg.
Chicago 4.....2127 McCormick Bldg.
San Francisco 11....1233-22 Battery Street Bldg.
Philadelphia 3...1616-1700 Walnut Street Bldg.
Atlanta 3.....2114 Healey Bldg.
Havana .....402 Abreu Bldg.
Detroit 26.....1501 Lafayette Bldg.

Plants in BIRMINGHAM, CHICAGO and GREENVILLE, PENNSYLVANIA

Water Supply and Treatment

An Ammonia Explosion

NO SOONER had we carefully chronicled that the odds against an ammonia explosion are about 99.99% (see p. 9, June 1947) than we got the report from Oneida, N. Y., that a fire and an explosion of eight 150-pound, bottle-type ammonia cylinders occurred on June 1, demolishing the chlorinating station and badly crippling the water supply. The various local papers reported that it was a chlorine explosion, which wasn't true but was close enough to the facts to show that something had happened to raise hob with the water works.

What actually occurred was that fire broke out by some unknown source in the 15-by-20-foot wood-constructed chlorination station. In the station were eight bottle-type, 150-pound ammonia cylinders, one partly emptied; one empty ton container of chlorine, and two full 100-pound cylinders of chlorine. One full ton container of chlorine was on a platform outside the station.

How the fire started is still subject to conjecture. The only known source of fire is an incandescent light bulb which was hanging on an extension cord. The light was used to warm the chlorine gas line behind the tray of the chlorinator. Lightning might also have caused the fire.

When the explosion occurred, the ammonia cylinders blew high, wide, and handsome, one fragment going through the porch roof of a nearby residence. The chlorine cylinders inside the building were damaged to some extent too. One had a hole in the wall and some of the others had the tops ruptured. All had the fusible plugs melted. The full ton container outside the building was undamaged. Fortunately, no one was injured seriously. Some of the men were mildly gassed.

Probably the explosion occurred because the fire caused the liquid ammonia to expand, rather than to ignite. The ammonia cylinders, because of their stronger construction, use no fusible plugs, and there was no way to relieve the pressure that the expanding liquid built up under these temperatures.

In any case, ammonia still remains safely classified as a poor gas to cause an explosion.

$900 Standpipe Salvage

AN old 120-foot standpipe was worth $900 to Erie, Pa., recently, mainly because of the enterprise of two structural iron workers, who took it down.

These men looked at the obsolete standpipe and said they could work from rowboats in the open top and cut the tank into half-ton sections with acetylene torches.

Two ten-foot rowboats were pulled to the top, 25 feet in diameter. From them, a rigger's scaffold was erected to cut out 3-by-10-foot sections of the 35-year-old structure. Tanks of acetylene and oxygen were cradled in a fifty-gallon oil drum hung on the pipe's edge. The huge cuts were lowered to the ground with steel cables, and a truck winch was anchored at the base of the stand-pipe. The job took about three weeks.

"Inspection recently revealed that the standpipe interior was becoming pitted," explained J. D. Johnson, General Superintendent of the Bureau of Water, "so we advertised that the city was accepting sealed proposals for taking down, removing, and disposing of the standpipe. We were astounded by the number of bids, fourteen, received on official proposal blanks.

"The extremes were funny—one bid asked for $5,500 for removing the standpipe, and, of course, the accepted one at the other end of the scale was a payment of $906.12 for the job, as it stood. Original cost of erection was $10,275 for the eighty-foot standpipe in 1912, and an additional $2,345 for the forty-foot standpipe in 1915, foundation not included."

The Water Bureau supervised the work insofar as it insisted upon lowering the steel sections for protection of a pump house near the standpipe's base, and a garage nearby. After the first 40 feet or so of the pipe was cut from the top and lowered, smaller pieces were dropped inside the water to settle at the pipe's bottom.

Chlorine Dioxide for Taste, Odor, Iron, and Manganese Problems

CHLORINE dioxide water treatment will not only overcome certain taste and odor problems connected with algae growth, but also will remove iron and manganese from certain water supplies, R. N. Aston of The Mathieson Alkali Works reported recently at a meeting of Minnesota Section of the American Water Works Association in St. Paul.

Mr. Aston described installations in Pennsylvania and Kansas, where severe algae difficulties existed. Chlorine dioxide application resulted in a taste- and odor-free water, with a satisfactory "free" chlorine residual.

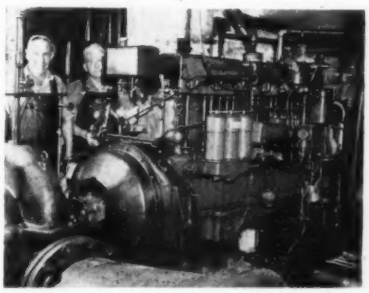
In two other installations in Pennsylvania, the introduction of the chlorine dioxide treatment for taste and odor control led to the discovery that this gas is also helpful in the removal of iron and manganese. In these instances, chlorine dioxide is applied before filtration to precipitate out these color-producing compounds. In one installation, chlorine dioxide is sometimes applied in the clear well when severe taste and odor problems develop.

Taunton's Diesel Support

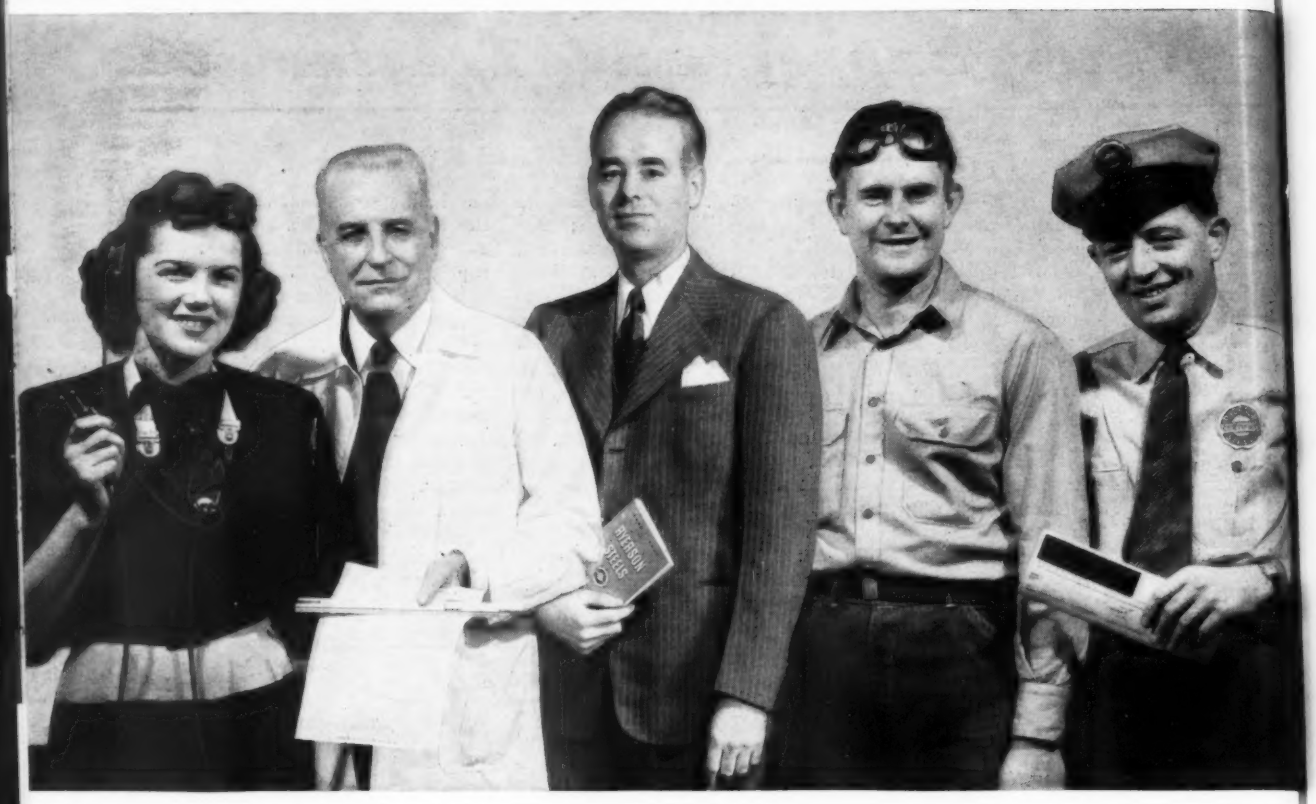
THE war-time growth of Taunton, Mass., and the presence of Camp Myles Standish within the city limits created a multiplied demand on the water facilities and invoked emergency measures on the part of Water Works officials to provide adequate service to meet domestic, industrial, and military requirements.

Normally, Taunton drew an adequate water supply from Elders Pond, but during the war years subscribers virtually pumped the pond dry. To prevent such an eventuality, city fathers had the piping facilities from nearby Asawompsett Lake extended to Elders Pond, and, with a "Caterpillar" Diesel D13000 engine driving the city's centrifugal pump, provided 6 mg of water daily to consumers.

The engine averages twenty-five full days of operation each month, shutting down only for oil change.



Doing a job for which it was not designed this diesel engine, nevertheless, gave a fine performance and saved the city from a serious water emergency.



We're not Doing You a Favor!

In these days of critical shortages, some firms seem to consider it a favor to provide a needed product. But here at Ryerson you'll find no seller's market complex. Every inquiry is still regarded as an opportunity to serve and every order a compliment to our organization.

Prompt shipment of steel from stock is our business. When we can deliver needed steel, we're more than glad to do it. The thanks belong, not to us, but to you for letting us work with you.

That's the way we have done business for more than 104 years—through good times and bad, and that's the way we continue to operate.

Much as we'd like to handle every item on all your orders, present conditions often make this impossible. But stocks of alloys, stainless bars, seamless tubing, and many other products are in good supply at each of our twelve plants, and products or sizes out of stock today may be available tomorrow.

So contact your nearest Ryerson plant for prompt, personal service. We may not always have all the steel you need but we'll certainly do everything possible to take care of you.

Joseph T. Ryerson & Son, Inc. Steel-Service Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles.

RYERSON STEEL

Street Construction & Maintenance

Indianapolis Renews Underpass Program

THE maze of railroad lines around Indianapolis, Ind., is gradually unravelling from the street system through a progressive program of grade separation structures. The present Morris Street improvement, recently completed, is typical. This structure included about 1,400 feet of pavement 44 feet wide at the underpass, providing four full traffic lanes. It separates Morris Street, one of Indianapolis' heavily travelled arteries, from the Indianapolis Union Railway Belt Line.

The underpass portion is low enough to require the construction of a pumping station to insure drainage at all times. Consequently, the design calls for the installation of two 3,500-gpm Chicago Pump Company pumps, float-controlled to keep the roadway clear.

The underpass was constructed under the direction of Tom Jacobi, City Engineer, with Harry Southard and H. L. Hodges, designers, and J. W. Newman of the City Engineer's office as project engineer. The cost of the underpass is divided among the city, the county, and the railroad on a 40-40-20 basis. This represents the first of eight to be constructed in a seven-year period.

The official designation of this project is the Dr. Walter E. Hemphill Underpass, so named in honor of a west side civic leader and former member of the City Council and Board of Public Works and Sanitation. The cost of the project was approximately $390,000.

The Board of Public Works and Sanitation has just awarded a similar contract to Smith and Johnson for the construction of the underpass at Shelby Street and the Indianapolis Union Railway Belt Line. The estimated cost on this project, which is similar to that of Morris Street, except that pumping is not required, is $500,000. The cost distribution is also on a 40-40-20 basis.

Other projects of this nature in the active stage of plan preparation are:

West Michigan St. and B & O and Big Four Railroads....	$650,000
East 11th St. and Monon and Nickle Plate Railroads...	300,000
South East St. and Indianapolis Union Railway Belt Line.	600,000

The remaining projects contemplated for construction in the seven-year period probably will cost in excess of $4,000,000.

The dividing islands and pump house of the Morris St. Underpass, Indianapolis.

The structures on the Morris and Shelby Street jobs were designed for the Indianapolis Union Railway by the Chicago Office of the Pennsylvania Railroad, supervised by J .D. Moffatt, Chief Engineer, Pennsylvania Railroad, Western Region, Union Station, Chicago.

Another very important grade separation project is that of the Kentucky Avenue and the Indianapolis Union Railway Belt Line being designed for early construction by the State Highway Commission. J. R. Cooper, Engineer of Bridges for the Highway Commission, is in charge of plan preparation, and Engineer Moffatt is in charge of structure plans. The estimated cost is be-

between the old and the new concrete.

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YOU can prevent new concrete from shrinking away from the old when making patches by a thorough tamping job. You should begin this tamping at the time the concrete has begun to set. This late tamping offsets the initial shrinkage and produces a good union between the old and the new concrete.

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Refuse Collection and Disposal

Questions and Answers from Louisville

Question: Do you have any exact figures that show the amount of garbage and refuse collected from the people of Louisville?

Mr. Wilson: Our studies, based on weighed results, show that each person contributed an average of 2.23 pounds of garbage and refuse per day. Each dwelling yields an average of 31 pounds of refuse per pickup. Based on an average of two collections weekly, this produces a figure of four people per dwelling. We collect 185,000 tons of refuse annually.

Q. Of the 185,000 tons of refuse collected each year, how much is domestic and how much is industrial?

A. Our studies indicate that roughly 69,000 tons come from industry and 116,000 come from city routes. Of course, certain of our industries maintain their own dumping grounds.

Q. To collect this refuse, do you have figures that indicate what the truck requirements are?

A. We operate forty trucks each day. Each truck carries 3.29 tons per load and averages 2.73 loads each day. Each truck travels an average of 5 miles per week on route collections and makes a total of 600 pickups, or 120 per mile.

Q. Have you similar figures for truck operations between the collection routes and the disposal points?

A. The average distance from the route to the landfill project is 6 miles. The trucks make this trip at 20 miles per hour.

Q. What type of collection trucks do you use?

A. The city owns 12 covered compactor-type trucks. The balance, noncovered type, are rented at a rate of $2.25 to $2.50 per hour, depending on the length of the working day. Both types hold roughly 14 cubic yards. The rent includes the driver and the truck.

Q. Have you noted any operating difference?

A. Yes, we have. The covered trucks require a driver and two men while the rented trucks must have an added man on the truck itself. The work, of course, is much easier on the covered city-owned trucks.

The American City interviews J. B. Wilson, Director, Department of Public Service, Louisville, Ky.

Q. Do you have any difficulties with the covered trucks?

A. Those trucks remind me very much of democracy. Just as democracy is the best kind of government, these truck bodies are the best kind of refuse collection vehicle, but both can stand a lot of improvement. The manufacturers seem to forget that the average refuse crew is relatively unskilled and not adept at using complicated equipment. Our maintenance costs on them are higher than they should be.

Q. We understand that you are using the land-fill method of disposal. What equipment do you use?

A. We have been using a Northwest dragline of ¾-yard capacity.

Q. What kind of operating procedure do you follow?

A. Some may criticize the operation we follow because of the fact that we do not cover each day's contribution. We find it impractical, since loads come in late in the evening and would arrive too late to be included in the covering operation. However, short of an outright breakdown of equipment we get each day's offering covered by the following day.

Q. Does this encourage rats or other nuisances?

A. For many years we have been spraying the landfill with a carbolic acid residue from the manufacture of artificial gas. We spray at the rate of ¼ gallon per square yard and by this means we have eliminated completely any rats or bugs that normally are associated with dumping operations. By spraying with crude carbolic acid, we were not bothered with them even when we were using the old-fashioned open dump.

Q. How much dumping area do you need?

A. One ton of refuse will occupy, according to our figures, 1.22 cubic yards of volume. As pointed out previously, each year the people contribute approximately 185,000 tons of refuse, requiring a yardage of 225,785 cubic yards. This calls for a space approximately 800 feet square and 9½ feet deep, or 500 feet square by 25 feet deep based on our present population of 350,000.

Q. Do you have such an area conveniently located?

A. Yes, we have fill area that will care for us for some time in the future.

Q. Have you observed settlement in fills of this nature?

A. Our experience indicates that fills built by dragline will settle approximately 25% before becoming stabilized. Our feeling also is that they never should be used for anything other than parks and recreational area. We have seen some fills that have been in place for many years, and when these were uncovered they broke into flame. The decomposition was slow in place, but when put in contact with oxygen from the air, it exploded by spontaneous combustion.

Q. Does Louisville allow the use of kitchen garbage grinders as a household method of garbage disposal?

A. Yes we do. In fact we encourage their use. Louisville does not labor under any misapprehension that ground garbage is going to congeal and clog our sewers.

Charleston Drops Service Charge

BY a two-to-one referendum vote, Charleston, W. Va., recently dropped the refuse-service charge that has been used for the past five years to finance the construction and operation of the city's refuse incinerator. Charleston built the incinerator with the funds raised by issuing revenue bonds to be paid by the service charge. This charge amounted to $5.00 per year per family in single-family houses and $3.00 per year per family in apartments. It amounted to an annual revenue of $76,000 per year.

Present plans are to pay the $76,000 out of the general fund raised by tax levy.

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WHEN FIRE OCCURS—

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"It is generally recognized that there is no other thoroughly satisactory means of sending and receiving fire alarms than an approved fire alarm telegraph system. Telephones should not be relied upon to replace needed boxes nor to supplement any inadequacy in number or location of boxes."

—National Fire Protection Association

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Public Safety

Police Radio in Louisville

By WARREN LANE, *Radio Supervisor*
Louisville Division of Police
Louisville, Ky.

The crash shown here was so severe that this same photograph has been placed (in the clock cutout) on the dash of every police car in the city as a constant reminder. This wrecked patrol wagon had been racing to rescue an injured man at a fire, when it collided at an intersection with a truck loaded with iron. The officer driving the wagon was killed instantly and fire consumed the patrol wagon, ruining it completely, even melting the microphone. The radio transmitter and receiver were the only unharmed equipment left in the wagon.

TWO weeks after the crash described at the right, two of us from the Louisville Police Radio Section went to look at the radio chassis housed in a wooden compartment just behind the driver's seat. The wood was burned away and the equipment covered with the dark chemical the fire department used to extinguish the fire. We decided to take the chassis to the radio shop in order to determine the reaction of the equipment to the accident and the fire. We found to our amazement that both the transmitter and receiver worked. We cleaned off the chassis, put in a new set of tubes, and placed the units back in service. The equipment is Motorola FM radio apparatus.

The city of Louisville was a pioneer in police radio operations, starting in 1930 with one car and a Western Electric 9A transmitter on 2,442 kc. Two-way radio was adopted in 1939 with a talk-back channel on 35,220 kc. Then the system covered forty-seven two-way cars.

In 1944, after study of frequency modulated apparatus, the department adopted the present two-way FM police radio system on a frequency of 37.1 megacycles, using all Motorola equipment.

The central station consists of a 250-watt transmitter in the radio building and a 50-watt auxiliary transmitter which easily covers the entire city without any dead spots. There are about ninety radio cars, seventy of which are police cars; the remainder are used by the fire department and other mobile units of city departments for electrical maintenance, traffic-signal repairs, and wreckers.

The dispatching is done from a room in the police department where the switchboards for all incoming calls are located. After considerable experience with both systems, it has been found that the radio control and switchboards must be together to expedite police dispatches with the flexibility necessary to handle the constantly varying problems of the emergency service.

All repairs are made at the radio building, where are located also the radiotelegraph transmitters, by which intercity and interstate communications are made. The radiotelegraph is a great boon to police operations, because it has many valuable attributes not offered by other means of communications. Mobile repairs, monitoring, and technical work, as well as the radiotelegraph communications, are all done here by a technical staff of six men who hold first-class licenses from the Federal Communications Commission. This arrangement is both efficient and economical. As these men are employes of the police department, the city has complete control of its communication network without interference from outside interest.

The personnel of the Louisville police department consists of approximately 500 under Colonel Carl Heustis, Chief of Police. Major Charles Doyle is the Night Chief, and Major James Malone is the Chief of Detectives. All commanding officers are unanimous in their desire for the extended use of police radio operations and consider radio one of their best weapons in the fight against both traffic violations and criminal offenses.

"The Midnight Alarm" for Visiting Fire Chiefs

ALL those attending the 1947 convention of the International Association of Fire Chiefs will have the opportunity of witnessing an exciting spectacle, "The Midnight Alarm," presented by the New York City firemen in Madison Square Garden on August 18, 19, and 20. Fun and music out of the old horsecar era precede the feature, which shows how New York fights a multiple-alarm fire.

"Cobweb Hall," a crowded tenement, is to be set up in the middle of Madison Square Garden. A passerby, aflood with the spirit of the era, carelessly tosses a cigarette butt into the vestibule. Slowly the sparks take hold, and foot by foot the flames reach upward until the fire is discovered and an alarm transmitted. Engine, ladder, and rescue companies, with floodlight, ambulance, and other apparatus, respond and take over as with the handling of an actual fire. This is a job of lifesaving, and the ladders and nets are busy. Everyone of the cast of 300 is a member of the New York City Fire Department.

The side-arena seats for the evening performance of August 20 are reserved for the members of the Association, who will be guests of the New York City Fire Department. Tickets can be obtained by writing to Frank J. Quayle, Fire Commissioner, Municipal Building, New York 7, N. Y. The prices range from $2.40 to $12.00, the entire proceeds to go to the Welfare Fund of the New York City Fire Department.

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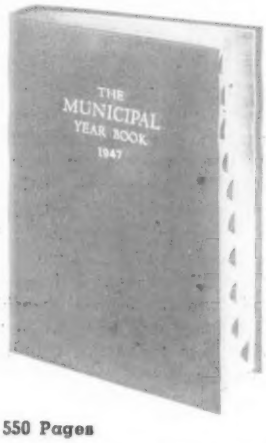

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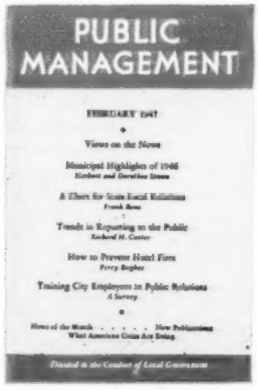

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The International City Managers' Association

1313 East 60th Street **Chicago 37, Ill.**

Airports and Aviation

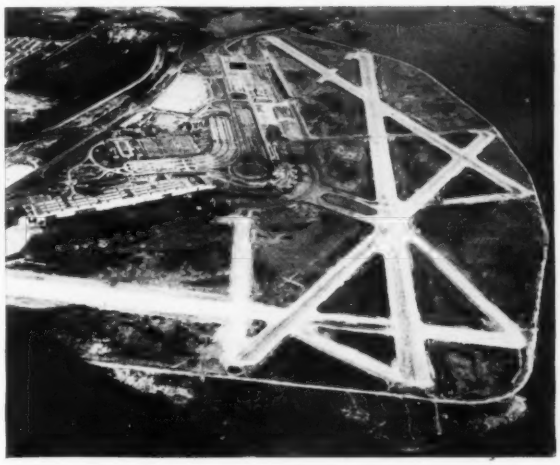
Essentials of Efficient Airport Drainage

COMBINED drainage systems that remove both surface and sub-surface water in one line have a practical application in airport construction, said William C. Slee, Airport Engineer of The Robinson Clay Product Company, Akron, Ohio, in a talk delivered before the American Road Builders Association meeting in Chicago, Ill., recently.

There are two types of these combined systems that have been successfully used. In one type, the pipeline is installed at the edge of the runway, taxiway, or apron, and a porous backfill is brought up to the elevation of the finished grade. In the other type, the runway or paved surface is designed with gutters inside the edges of the paved section. In this case, the pipe line is installed directly under the flow line of the gutter, and the surface water enters the line through grade-top catch basins.

For either kind of combined installation, Mr. Slee believes that the best type of pipe to use is either semi-perforated pipe with sealed joints, or cradle-invert pipe, commonly called skip pipe.

A big advantage of a combined drainage system, according to Mr. Slee, is that it intercepts the surface water at the edge of the paved surface and eliminates the danger of destructive wash and erosion over newly-seeded shoulders. Another advantage pointed out is that surface water removed at the edges of the pavement does not have a chance to work in under the edge of the pavement, soften the sub-grade, and establish a definite area of pavement failure when heavy wheel loads are imposed on this area.



The Washington National Airport is an example of good drainage. The Washington port uses vitrified clay cradle-invert pipe at the edges of all runways and ramps.

The installation of underdrains represents but an infinitesimal portion of the cost of an airport, Mr. Slee emphasized, and in borderline cases it might be wise to consider a system of underdrains as cheap insurance to protect the entire investment. Proper design of the porous backfill, employment of competent drainage engineers, and the utilization of experienced field engineers and inspectors during construction were listed by Mr. Slee as absolute necessities.

Port of Oakland Celebrates Twenty Years of Service

Now the base of five major transoceanic air lines which span the Pacific Ocean in a matter of hours, the Oakland Municipal Airport, Oakland, Calif., this summer will observe the twentieth anniversary of the first three transoceanic flights ever made on the Pacific, and the twentieth anniversary of its own existence.

The three flights to be commemorated are: June 28, 1927—First trans-Pacific flight, time: 25 hours, 50 minutes; July 14, 1927—First civilian trans-Pacific flight, time: 25 hours, 36 minutes; Aug. 16, 1927—the Dole Transpacific Race, won by Arthur Goebel; pilot, Lieut. William Davis, USN, navigator; time: 26 hours, 17 minutes.

Now, the DC-4 Skymaster planes make the over-water hop to Honolulu on an average of eleven hours, with a capacity of thirty-four passengers each.

The Oakland Airport, where the anniversaries of the Maitland-Hegenberger, Smith-Bronte, and Dol Race trans-Pacific flights are being observed.

There's no ceiling on

BIOFILTRATION PLANT SIZE

250 installations ago, the Dorr Biofiltration System was introduced as an improved method of sewage treatment. These 250 installations have conclusively demonstrated outstanding cost-saving advantages for the small and medium size plant.

Now – based on recent studies – it is evident that Biofiltration is equally adaptable to plants of any size; that the proven efficiencies and economies of small and medium size plants hold true for treatment on *any* scale.

As an example, on a first cost basis, Biofiltration shows up just as favorably for large plants as it does for small. On an operating cost basis, Biofiltration economies actually increase in direct ratio to increased plant size. *The bigger the plant, the greater the operating economy of Biofiltration compared with other methods.*

These – and the advantages listed at the right – are but part of the story. We would welcome an opportunity to tell you more factually and completely *why* and *how* Biofiltration fits the big scale treatment picture.

ADVANTAGES OF DORR BIOFILTRATION FOR LARGE PLANTS

(1) Uniform final effluent regardless of feed fluctuations or shock loads.
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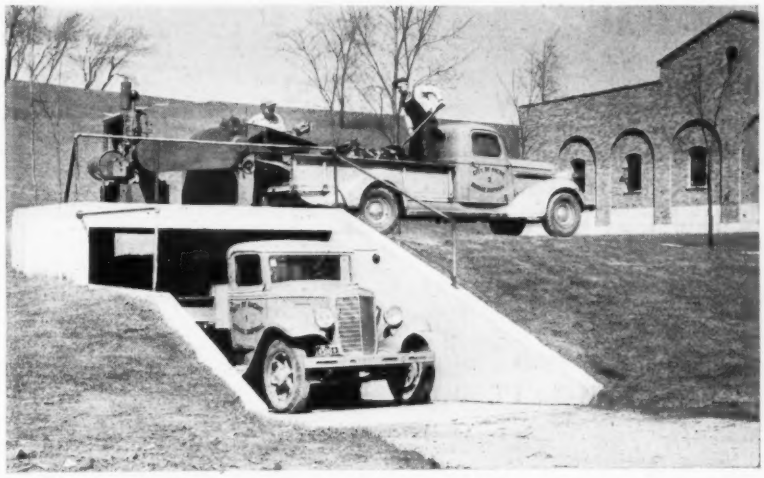
Sewerage and Sewage Treatment

To the Engineering Editor of The American City:

I have enjoyed reading your editorial, "A Sewerage Centralia." No truer words have ever been written and you have my compliments for making what are today very dangerous statements. It takes courage to express one's self when he knows progressive ideas may brand him as a bureaucrat or, still worse, a Communist. Our democratic government is dependent upon our considering it as a living, active, and growing thing, and progressive engineers are needed to build a good healthy democracy.

More power to you, "Good American," and progressive engineer.

DON E. BLOODGOOD,
School of Civil Engineering, Purdue University, Lafayette, Ind.



Sludge from the Racine sewage treatment plant being ground in a hammermill.

City's Responsibility for Backfilling Water and Sewer-service Cuts

WHEN backfilling any water or sewer-service cut, the Kansas City Department of Public Works now does the job in accordance with its own specifications. This permits the backfill and pavement repair to be made within forty-eight hours after the plumber completes the connection.

At present, the service is being applied only to a portion of the city. However, as soon as sufficient equipment is available, the department will take over the responsibility for the entire system.

Century-old Hexagonal Pipe

City Engineer Paul W. Maetzel, left, shows Deputy City Engineer Orris Bonney the unusual flanges on a recently-unearthed hexagonal clay pipe. Almost a century old, this example of some of the first machine-made clay pipe was found in the Beechwold section of Columbus, Ohio.

Ground Sludge for Gardens

RACINE, Wis., doesn't miss an opportunity to make good use of its sludge. Each year from 1.5 to 2 million pounds of sludge are used on gardens, lawns, and fields around Racine, with 35% of it ground by a hammermill.

Thomas T. Hay, Superintendent of Sewage Disposal, states that he has experimented with several types of shredders, pulverizers, and grinders and found that the most satisfactory type was a hammermill. The limiting factor was the blower which would plug if the moisture content was over 30 percent. This difficulty was removed by elevating the mill and dropping the sludge through the mill into a truck at a lower level. In this manner, Superintendent Hay is able to grind sludge up to 50% moisture, although a figure of 30% seems about "optimum." Less moisture produces an excessive amount of dust during grinding while more than this will produce mold in the stock pile. The users obtain the sludge from the stockpile; the plant does not bag it for them.

Mr. Hay uses a two-inch screen prior to sending it into the hammermill. However, by regulating the speed of the mill, he can dispense with the screen.

The plant uses a Harvey Mfg. Co. #710 hammermill powered by an International Harvester Co. U6 gasoline unit. This combination grinds at the rate of 4 tons to 7 tons per hour, the faster rate with the drier sludge.

Racine digests the sludge in three Dorr digesters and dewaters it on glass-covered drying beds. The digested sludge before dewatering contains from 9% to 10% solids. The beds are filled to 10 inches in summer and 8 inches in winter. On sunny days, the temperature in the beds is 40°F above the outdoor temperature, both in winter and summer. Its average analysis by years is as follows:

Year	NH_3	P_2O_5	K_2O	Grease	Humus	Moisture
1938	—	—	—	—	—	—
1939	3.0	2.5	0.4	4.1	41.5	39.5
1940	2.7	2.3	0.4	3.7	43.4	52.0
1941	2.6	2.4	0.2	3.5	43.7	52.4
1942	2.7	2.3	0.3	3.2	44.6	45.2
1943	2.57	2.25	0.37	4.98	42.9	34.6
1944	2.57	2.20	0.5	4.85	43.0	39.9
1945	2.7	2.5	0.5	5.2	45.0	42.0
1946	2.88	2.25	0.45	4.11	47.0	43.0

The amount of sludge ground through the hammermill is summarized here:

Year	Pounds Ground	Pounds Cake	Total Pounds	Percentage Ground
1938	0	0	0	0
1939	0	496,618	496,618	0
1940	841,189	214,700	1,055,889	80
1941	65,960	843,300	909,260	7
1942	190,800	711,048	901,848	21
1943	307,500	205,350	512,850	60
1944	213,790	665,560	879,350	25
1945	279,000	573,140	852,140	33
1946	424,560	411,490	836,050	51

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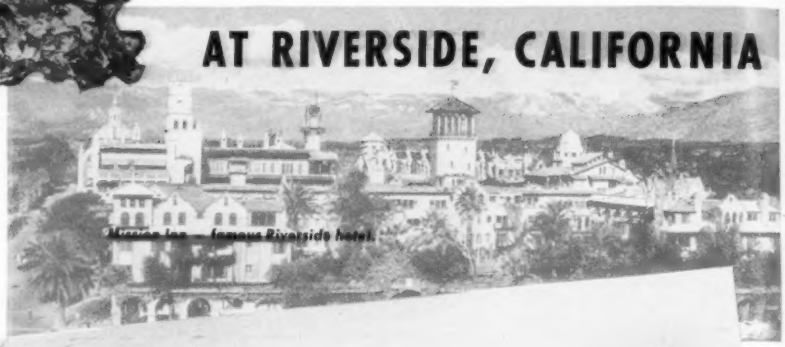

Mission Inn — famous Riverside hotel.

Some 20 acres of burned garbage are being economically cleaned-up and buried by using the Drott Bullclam Shovel Method of Sanitary Fill.

• • •

AREA METHOD USED

On this type of operation refuse is pushed or carried over a wide area and piled up into long mounds. It is compacted as placed, then covered with earth. Lower photo shows assembled refuse, top photo shows it after being covered.

Covering material is obtained from the cleaned-up area — some twenty feet back from the beginning of the accumulated refuse. By successive pushing or carrying, trenching and covering, a landscaped area is obtained, suitable for a park or playground.

Both old and current waste is handled. Refuse hauled in daily is dumped into the trenches from which the covering material is obtained.

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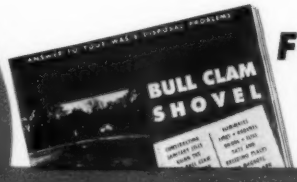

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808 An improved granular germicide and disinfectant composed essentially of a stabilized calcium hypochlorite is now being marketed by the Pittsburgh Plate Glass Co., Columbia Chemical Div., Fifth and Bellefield Aves., Pittsburgh 13, Pa. Named Pittcide, the new product shows no appreciable loss of strength in its bactericidal and deodorizing properties even over long periods of time. A booklet describing the multiple uses of Pittcide may be obtained by writing Dept. P. of the Company.

How Infiltration Fits Your Water Supply

809 The Ranney Method Water Supplies, Inc., 63 S. High St., Columbus, Ohio, will send you complete details on how your municipality may obtain a permanent supply of ground water by infiltration from rivers and lakes, and how such a method will give you an improved water of consistent character at low cost.

Equipment for Water, Sewage, Garbage Treatment

810 Catalog No. 775-A, distributed by The Jeffrey Mfg. Co., 970-99 North Fourth St., Columbus 16, Ohio, describes in detail the company's line of sewage and water treatment equipment, including equipment for high-rate bio-filtration plants. Among the pieces of equipment specified are bar screens, chemical feeders, grit and sludge collectors, garbage and screenings grinders, and floctrols.

Cheap but Good Concrete Repairs

811 Gunite is one of the most economical methods of repairing concrete structures. The method consists of applying a covering of concrete of any desired thickness by means of a "cement gun." The result is a repaired structure. For full details, write the Pressure Concrete Co., 6 Avenue B, Newark, N. J.

Four-Cycled Diesels Provide Low-Cost Power

812 The Worthington Pump and Machinery Corp., Engine Division, Buffalo, N. Y., will send you information on its line of four-cycle diesels, which may be obtained with the turbo-charging feature. Diesel engines are available from 150 to 3,520 hp; gas engines, from 175 to 3,290 hp, and dual-fuel diesels, from 225 to 3,290 hp.

Power Sweeper For City Streets

813 The Wayne motor sweeper is particularly valuable for sweeping streets, since it can operate close to curbs. One model has a 2-cubic-yard dirt capacity, 100-inch wheelbase, and 14-foot turning radius. For literature, write the Brown-Bevis Equipment Co., 4900 Santa Fe Ave., Los Angeles 11, Calif.

How to Use the Cement Gun

814 The Cement Gun Co., Allentown, Pa., in Bulletin 2300, has published a comprehensive description of the procedure, applications, and structural benefits entailed in the use of the Gunite method of concrete construction and reinforcement.

Street-Sweeper Can Carriers

815 The Tarrant Mfg. Co., East Ave., Saratoga Spa, N. Y., manufactures a carrier for street-sweeping cans, either rubber- or steel-tired, with roller or plain bearings. All frames are welded. For literature, write to the company.

For Smooth Lawns

816 Worthington Mower Co., Stroudsburg, Pa., will send you information on the most efficient powered mower to care for your needs, whether you require one for a park, highway, or airfield. The mowers are available in gang units, with speeds up to 47 miles per hour.

Underground Line Locator

817 The Wilkinson line locator is an all-in-one piece of apparatus—it can be carried in one hand while the operator manipulates the controls with the other. The mechanism locates mains, services, valves, stubs, and similar equipment. For illustrated literature, write the Wilkinson Products Co., P. O. Box 1774, Wilshire-LeBrea Sta., Los Angeles 36, Calif.

Eliminate Insects With a Mist Sprayer

818 The Lawrence Aero-Mist sprayer is applicable by tree, park, and health departments for protection against insects and defoliators. Bulletin 21, giving full details on methods of application and the construction of the mechanism, may be obtained by writing to The Lawrence Aero-Mist Sprayer Co., 58 Federal St., Greenfield, Mass.

Chlorine Feeder For Sewage, Water, Pools

819 The SterElator, manufactured by the Everson Mfg. Co., 203 W. Huron St., Chicago, Ill., is a mechanism that regulates the flow of chlorine gas manually, semi-automatically, or completely automatically, utilizing a 24-inch water-gauge vacuum and visible flow meters. Write for specifications.

Bronze Tablets For Lasting Memorials

820 The United States Bronze Sign Co., Inc., 570 Broadway, Dept. AC, New York 12, N. Y., will send you a catalog illustrating various types and sizes of memorial tablets.

Co-ordinated Control Units For Sewerage and Water Plants

821 General Electric's Cabinetrol is a factory-assembled unit containing all the control devices specified by you for either sewerage or water treatment. This saves space and facilitates installation, and the unit may be enlarged easily. For information, write Apparatus Dept., General Electric Co., Schenectady 5, N. Y.

Simplified Drive System Yields Smooth Bituminous Mix

822 The Barber-Greene new drive system transmits power from a central power unit, through shafts, to the dryer, cold elevator, reciprocating feeder, hot elevator, and gradation control unit. The result is a highly uniform bituminous mix. For descriptive literature, write Barber Greene, Aurora, Ill.

Cut Sewage Collection Costs by Using Asbestos-Cement Pipe

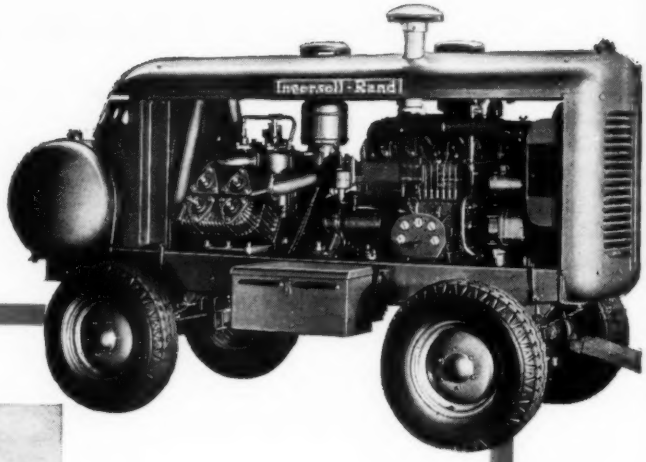
823 Johns-Manville, Box 290, New York 16, N. Y., will send upon request Brochure TR-21A, describing the seven ways that Johns-Manville transite sewer pipe helps to cut sewerage costs.

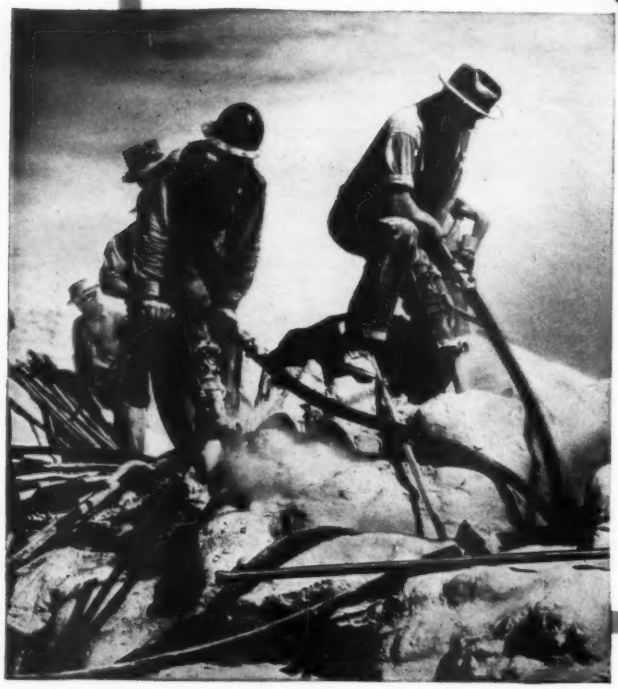
Leak-Proof Concrete Storage Tanks Use Prestressed Design

824 If you plan to build concrete storage tanks for either water or sewage treatment plants, and you want the latest thing in design literature on how they should be prestressed in order to make them structurally strong and leak-proof, write to Preload Enterprises, Inc., 420 Lexington Ave., New York, N. Y. This company has a number of tanks built according to this design and will refer you to them if you wish.

(*Continued on page* 23)

KEEP VALVES CLEAN...





GET MORE AIR

PROTECT YOUR DRILLS. Effective lubrication does it! Texaco Rock Drill Lubricants (E.P.) prevent rust in service and in storage, resist washout, protect all moving parts against wear even in the heaviest service. They conform to lubrication specifications of leading rock drill manufacturers.

What's the best way to keep compressor valves clean?

Effective lubrication—Texaco Alcaid, Algol or Ursa Oil.

Why those particular oils?

Because *Texaco Alcaid, Algol* and *Ursa Oils* are especially refined to free them of impurities that form hard carbon deposits. Any slight amount of carbon that may form in use is soft and fluffy—won't impede valve action.

That all?

No. These oils keep rings free, too—and ports and air lines clear. Your compressors run more efficiently, give full air pressure at your drills. Thus you have less maintenance expense—fewer repairs and overhauls.

All right, which of the three do I use—Alcaid, Algol or Ursa Oil?

They're all in the same series, developed for effective compressor lubrication. Use the one recommended by Texaco Lubrication Engineering Service for your particular operating conditions.

Where can I get Texaco service and products?

Just call the nearest of the more than 2500 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Tune in...TEXACO STAR THEATRE presents the NEW TONY MARTIN SHOW every Sunday night. See newspaper for time and station.

Stop—Check and Mail

Use Coupon on Page 21

The Duty of Water Works Valves

825 Valves should serve two purposes in water-works installations—they should perform their job, and they should require a minimum amount of maintenance. For the story on how Eddy valves fulfill these two obligations, write to the Eddy Valve Co., Waterford, N. Y.

Designed for Digging Bigger Loads

826 The ML 4 Athey MobiLoader is designed for digging big loads. With hydraulic controls for ease of operation, the loader travels in a straight line from digging to discharging. For details, write Athey Products Corp., 5631 West 65th St., Chicago 38, Ill.

Automatic Voting Machines

827 Accuracy and speed are the primary objectives obtained through the voting machines manufactured by the Automatic Voting Machine Corp., Jamestown 55, N. Y. If your municipality is in the market for voting machines, write for information and data.

Pave with Steel Forms

828 Whether your municipality is interested in a sidewalk-, curb-and-gutter-, or street-paving job, you should have the information contained in Catalog No. 1859 distributed by the Blaw-Knox Co., 2102 Farmers Bank Bldg., Pittsburgh 22, Pa., about this company's steel forms.

Wobble-Wheel Roller Compacts Smoothly

829 The Bros Wobble-Wheel roller applies uniform fluid pressure, and the result is a smooth, voidless compaction job. Pneumatically tired, the machine may be used for packing earth fills, rolling crushed rock bases, and compacting roads, bituminous surfacing, and turf surfaces. Write to The Wm. Bros Boiler and Mfg. Co., Minneapolis 14, Minn.

Want Your Pipe Cleaned?

830 If your municipality is being served by pipe that is inefficient because of retarded flow caused by caked accumulations, you may be interested in obtaining information about the service offered by the Flexible Underground Pipe Cleaning Co., 9059 Venice Blvd., Los Angeles 34, Calif. Write to Department AC-6.

Flame-Gun Destroys Weeds, Disinfects, Thaws

831 The Hauck flame-gun can be used in the summer to destroy weeds and to disinfect buildings and equipment. In the winter, this controlled flame thrower may be used to thaw frozen pipes, melt ice around drains and culverts, and to thaw frozen earth to facilitate digging. Catalog No. 2028 gives all the details. Write the Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N. Y.

Gas Engines Have Generator Rotor

832 The Rathbun-Jones 4-cycle, water-cooled gas engines are designed with a generator rotor supplanting the customary flywheel. The pistons are oil-cooled, and the engines may be obtained to run on sewage-digester gas. For additional information, write to The Rathbun-Jones Engineering Co., Toledo, Ohio.

Water Purification Equipment

833 For information about water-filtration plants and equipment, zoelite softeners, Wheeler false-filter bottoms, and pressure filters, write to the Roberts Filter Mfg. Co., 660 Columbia Ave., Darby, Pa.

Fire Extinguisher Information

834 The Fire Extinguisher Data Guide is a sliding-column affair that instantly gives information on the suitability of different types of extinguishers for each type of fire. The Data Guide may be obtained by writing to the Randolph Laboratories, Inc., 8 East Kinzie St., Chicago 11, Ill.

Automatic Parking Meters Give Economy of Operation

835 Automatic operation, tamper-proof coin register, cumulative record of amounts deposited, and large capacity coin box all contribute towards making the Magee-Hale Park-O-Meter an important contribution in the municipal-revenue field. For illustrated literature, write the Magee-Hale Park-O-Meter Co., Commerce Exchange Bldg., Oklahoma City 2, Okla.

Coin Sorter for Efficiency

836 The error-proof way of sorting, counting, and wrapping coins is by machine. The Universal Business Equipment Co., 537 S. Dearborn St., Chicago 5, Ill., will send municipal officials descriptive circulars giving full data on the adaptability of these coin-sorters, particularly for parking meter use.

Pneumatic Ejector Controls Small Sewage Flows

837 The Carter pneumatic sewage ejector contains no moving parts, cannot clog, and has the ability to pass solid material the same size as the suction inlet. Bulletin 4601, containing line drawings and a table showing the proper size ejector for various needs, will be sent on request by the Ralph B. Carter Co., Hackensack, N. J.

Machines Count Coins

838 In many cities, especially parking-meter cities, a coin-counting machine is essential. These machines, which come in a wide range of sizes and prices, are built to count any denomination of coins. Hand models are available for small towns, municipal swimming pools, and toll bridges. Electrically driven machines count, package, or bag at a far faster rate. Literature is available describing not only coin counters but numerous other financial and tax office supplies as well. To obtain a free copy write Abbott Coin Counter Co., 143rd St. and Wales Ave., New York 54, N. Y.

Instruments Make Operation Accurate

839 Whether your municipal responsibility is water, sewerage, street construction, or garbage and refuse incineration, you will recognize the important part that good control instruments play in insuring efficient operation. A new bulletin, No. W1811, lists the control instruments in stock. The instruments are manufactured by the Bristol Co., Waterbury 91, Conn.

Portable Air Compressors

840 A new bulletin has been issued by the Davey Compressor Co., Kent, Ohio, describing the new Davey Air Chief portable compressors of 60, 105, 160, 210, and 315 cfm capacity and including a description of the Davey permanent peak efficiency valves. Also described is the Equi-Balanced crankshaft recently invented by the company's president, Paul Davey.

Dependable Fire Alarms

841 The Gamewell Co., Newton Upper Falls 64, Mass., will send you a pamphlet that illustrates the vital importance of dependable fire-alarm boxes. The pamphlet will be sent without charge.

Recondition Pipe Underground

842 The Centriline process is a complete reconditioning method that starts with cleaning and is followed by the application of a premixed cement mortar lining that is applied centrifugally without rebound. The work is performed while the pipe, 24-inch and larger, is in place. For information, write the Centriline Corp., 140 Cedar St., New York 6, N. Y.

Centrifugal Pump Information

843 Whatever type or size of centrifugal pump your municipal water works plant may require, you will be able to get valuable information from Fairbanks, Morse & Co., Chicago 5, Ill. Precision built, the pumps are adaptable to varied usages.

Semi-Automatic Orifice Fittings For Accurate Measurements

844 Robinson's Type E orifices automatically adjust to center, and stay there, resulting in a high degree of accuracy and eliminating gas leakage. For data and specifications, write for Catalog No. 6, Robinson Orifice Fitting Co., 1435 Santa Fe Ave., Los Angeles 21, Calif. The catalog which will be sent without charge, contains many illustrations.

Chlorinators Take the Danger Out of Sewage

845 To sterilize sewage effectively, the Wallace & Tiernan Co., Inc., Newark 1, N. J., manufactures a series of chlorinators for use in the prevention of septicity, for odor control, and for effluent treatment to achieve sterilization. Information and specifications of each type of mechanism will be sent on request.

How to Judge Proper Dosage For Algae Control

846 The "D. M." test indicates the exact amount of chemical required to destroy or to inhibit algae growth, eliminating ineffective under-dosage and wasteful over-dosage. For illustrated literature, write the LaMotte Chemical Products Co., Towson, Baltimore 4, Md.

Meter Parking For Twelve Minutes or More

847 The Duncan meters work on a one-cent-or-more cumulative principle. The depositor inserts just enough coins, from one penny on, to cover the exact length of time he wants to park. Each penny gives a twelve-minute parking period. For details, write the Duncan Meter Corp., 835 N. Wood St., Chicago 22, Ill.

Street Flushers Keep Streets Cool and Clean

848 An important phase of street maintenance during the summer is keeping the pavements cool. Flushers perform this service, as well as that of keeping streets clean. For details, write E. D. Etnyre & Co., Oregon, Ill. These flushers can throw a stream up to 42 feet wide.

Anthracite Filter Removes Odors, Tastes, Bacteria

849 Anthrafilt, suitable particularly for the removal of fibrous material found in swimming pools as well as tastes, odors, bacteria, and micro-organic matter, requires a comparatively small amount of wash water and has a short wash cycle. Data may be obtained from the Palmer Filter Equipment Co., 822 E. 8th St., Erie, Pa., representing Anthracite Equipment Corp., Anthracite Institute Bldg., Wilkes-Barre, Pa.

(*Continued on Page 24*)

Syracuse, N.Y. chooses the popular, dependable

MI·CO PARKING METER

. . . and orders 1750 of them. But before placing the order, Syracuse officials satisfied themselves, by exhaustive tests and surveys, that MI-CO Meters have what it takes to keep operating under all sorts of adverse conditions. And that they do it with a minimum of upkeep expense. ¶When you examine the sturdy construction of a MI-CO Meter, and see how few working parts there are, it's easy to understand why so many cities, large and small, are installing MI-CO Parking Meters. They are thoroughly dependable, and you can be sure they will pay out quickly because MI-CO's are seldom out of order. ¶We should be glad to send you complete details, as well as facts and figures on the unusually low maintenance expense of MI-CO Parking Meters. Write today!

MI-CO METERS, 231 Court St., Covington, Ky.

Division of The Michaels Art Bronze Co., Inc., Covington, Ky.

Check and Mail

Use Coupon on Page 21

Pumps Operate Under Water

850 The Byron Jackson Co., Los Angeles 54, Calif., will send municipal officials Bulletin No. 46-5000 describing its submersible pump. The close-coupled deep-well turbine pump and electric-motor unit operate entirely submerged in water of any well-depth.

These Power Lawn Mowers Are Easily Maneuvered

851 The Locke Steel Chain Co., Lawn Mower Division, Bridgeport, Conn., manufactures three types of single unit power lawn mowers, and two triplex models with cutting swath from 25 inches to 75 inches. The mowers are constructed to cut close to obstacles, as well as under overhanging shrubbery. Included is a sulky model. Literature is available.

Concrete Meter Boxes

852 Art Concrete meter boxes eliminate corrosion and prevent meter "sweating." Available in various sizes, with shut-off valve with self-closing hinged iron reading lid, these meter boxes add years to meters. For information, write the Art Concrete Works, Pasadena, Calif.

Error-Proof Voting Machines

853 The Shoup electric voting machine is constructed to prevent any inadvertent error on the part of the voter; the final count for each candidate is clearly indicated at the end of the day—no decoding necessary. For information, write the Shoup Voting Machine Corp., Girard Trust Co. Bldg., Philadelphia, Pa.

Fire Pumpers

854 The Ward LaFrance Truck Division, Great American Industries, Inc., Elmira, N. Y., has a complete line of pumpers ranging in size for the needs of the small as well as large municipality. If your city is contemplating the purchase of additional equipment, you may be interested in obtaining information from this company.

Stationary and Marine Diesels

855 Enterprise Engine & Foundry Co., 18th and Florida Sts., San Francisco 10, Calif., can offer your municipality a wide line of stationary and marine diesels which incorporate the most modern variations for facile adaptability to varied usage. Write to the company for information about its line of diesels and its world-wide servicing facilities.

Interchangeable Barrels On Water Hydrants

856 Mathews hydrants have a 360-degree rotation of the heads on swivel flanges; the nozzle levels may be raised or lowered. Of primary importance is the fact that these hydrants may be given new barrels, which contain all the working parts, in just a few minutes; the entire transfer is accomplished above ground. For details, write the R. D. Wood Co., Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

Accurate Water Metering

857 The Worthington-Gamon liquid meters come in all sizes to measure the smallest to the largest liquid flow, and are available in either current or velocity design. For specifications, write the Worthington-Gamon Meter Co., 296 South St., Newark 5, N. J.

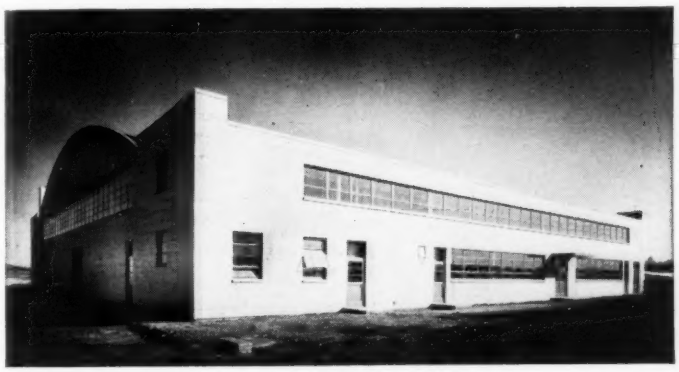
Apco-V-Apco Primers

858 The Valve and Primer Corp., 30 W. Washington St., Chicago 2, Ill., will send you data on its line of Apco-V-Apco primers and air-release valves for filter pipelines and distribution lines.

(*Continued on Page 26*)

LURIA STANDARD BUILDINGS

FOR AIRPORTS & INDUSTRY



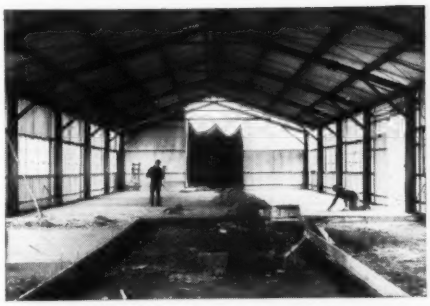
Hangar and Shops—Westchester County, N. Y.

MAINTENANCE AND STORAGE HANGARS

Luria Standard Hangars are available with clear door openings from 60 feet to 160 feet with contour clearances carefully chosen to accommodate all standard makes of planes. By allowing complete freedom of choice in length and in size and type of lean-to's, these Standard Units can be adapted to meet any combination of shop, storage and office requirements. All sizes of Luria Standard Hangars are designed in two weights—one to meet the load requirements of northern climates, and the other to effect the utmost economy for southern climates. Supplementing the Standard line, Luria is also prepared to design and furnish Hangars to meet any special requirements.

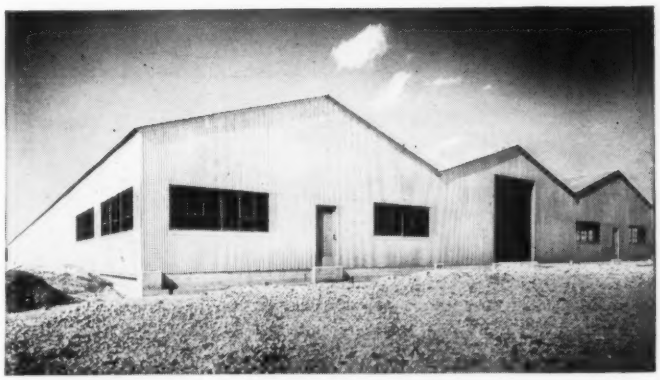
INDUSTRIAL BUILDINGS

Luria offers a complete line of Standard Industrial Buildings varying in clear span widths from 40 feet to 100 feet with inside clearance at eaves ranging from 12 feet to 20 feet. All Luria Standard Buildings are permanent structures designed for maximum utility and flexibility. The unit system of expansion both in width and length combined with a choice in location of doors and sash provide unlimited variation in size and arrangement. These features allow a selection of combinations that are calculated to meet most individual requirements, thereby eliminating the expense of special engineering and gaining the benefit of production line economy. Simplicity of design featuring prefabricated frames of structural steel, insures easy handling and economical erection.



Interior single A-40 — Peoria, Ill.

WRITE FOR BOOKLET AND PRICES



Warehouse—Multiple 3 A-40's—Bayonne, N. J.

LURIA ENGINEERING CORPORATION

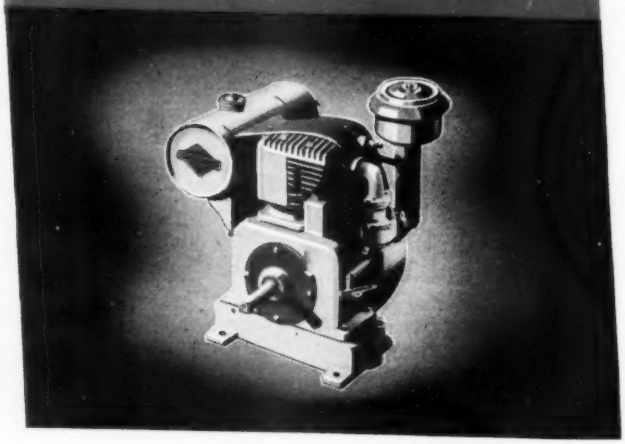
500 Fifth Avenue,
New York 18, N. Y.

First National Bank Bldg.,
Chicago 3, Illinois

THREE MILLION

BRIGGS & STRATTON ENGINES

A NEW PEAK IN GASOLINE POWER HISTORY



When the 3 MILLIONTH Briggs & Stratton engine came off our production lines recently, a series of new records was established for the entire industry. It is by far the greatest number of 4-cycle air-cooled engines ever built by one manufacturer. It is by far the longest period . . . more than 27 years . . . that any manufacturer has built 4-cycle air-cooled engines *continuously, without interruption.* Back of these engines Briggs & Stratton maintains the most extensive, worldwide network of *Authorized Service Stations* in the small engine field.

Preferred Power FOR INDUSTRIAL CONSTRUCTION RAILROAD AND FARM EQUIPMENT

BRIGGS & STRATTON CORPORATION
Milwaukee 1, Wisconsin, U. S. A.

AIR-COOLED 4 CYCLE BRIGGS & STRATTON GASOLINE ENGINES POWER

Check and Mail

Use Coupon on Page 21

Swimming Pool Designs

859 Information may be obtained about the numerous innovations incorporated in the economical pool designs and layouts of Wesley Bintz, 301½ S. Washington Ave., Lansing 25, Mich. Some of the newer features are specially-designed springboard supports, the ovoid pool, and the extended front. Photographs sent upon request.

Modernize Your Playground Apparatus

860 Municipal officials contemplating the modernization of playground equipment or the construction of new playgrounds may be interested in obtaining booklet No. 39, distributed by The EverWear Mfg. Co., Springfield, Ohio. Fully illustrated, the literature describes EverWear's many unique pieces of apparatus and the added safety devices on the standard types of equipment.

Reduce Traffic Hazards With New Control Mechanism

861 The Eagle Signal Corp., Moline, Ill., recently put on the market a new multi-dial controller for traffic lighting equipment. For information about this important method of reducing traffic hazards, write to the company.

Ready-Mixed Pipe Joiner Stops Root Trouble

862 Plastico is a compound designed for sewer pipe joints, ready mixed for trowel application. For a bulletin giving specifications and composition of the bituminous pipe-joint filler, which makes water-tight and root-proof joints, write to Paul E. Scott, Sewer Builders Supplies, 6250 South Michigan Ave., Chicago, Ill.

State Truck and Trailer Size Restrictions Booklet

863 The Four Wheel Drive Auto Co., Clintonville, Wis., has prepared a booklet giving a comprehensive listing of all state regulations relative to size and weight restrictions of trucks and trailers.

Plant-Mixed Asphalt Pavements

864 A detailed description of various types of plant-mixed asphalt pavings is contained in a new booklet being issued by The Texas Co., Asphalt Sales Dept., 135 E. 42nd St., New York 17, N. Y. The booklet covers the correct procedure and materials to be used with each type of paving.

These Asphalt Distributors Work Without Drip or Mess

865 The Gunnison Mfg. Co., Baraboo, Wis., will send you its illustrated folder describing the new swing-bar extension on its no-drip asphalt distributor. Also available is literature on Gunnison's street flushers and sprinklers.

All-Weather Airport Lighting

866 *The Lights That Bring Them In,* distributed by the Line Material Co., Airport Lighting Div., East Stroudsburg, Pa., is a nineteen-page illustrated booklet which explains why good airport lighting is important.

Renew Corroded Pipe

867 Tate Pipe Linings, Inc., Andover, Mass., will send you information pertaining to the complete rejuvenation of pipes while in place. By the Tate method the pipe is thoroughly cleaned first and then is cement lined under pressure of up to 130 pounds to the square inch.

(*Continued on Page 27*)

Check and Mail

Use Coupon on Page 21

No Water Hammer With Multi-Port Check Valves

868 Water hammer, the possible result of a sudden shutdown of pumping units, can be prevented by using a multi-port check valve which permits aqueduct flow to continue at a gradually diminishing rate after the pumps stop. For specifications, write the A. P. Smith Mfg. Co., East Orange, N. J.

Four-Steps-in-One Water Treatment

869 Accelator Bulletin 1824 describes the four-operations-in-one principle of Accelator water treating plants. This method combines quick mixing, coagulating, settling, and sludge removal in one unit. It saves in construction costs, simplifies operation, and reduces space requirements considerably. For the booklet, write Infilco, Inc., 325 W. 25th Place, Chicago 16, Ill.

Avoid Trenching When Laying Small Pipe

870 Pipes up to 15 inches in diameter may be pushed underground, without trenching. The pipe is pushed at a rate of from 1 to 5 feet a minute. For information, write Dept. P., Giant Mfg. Co., Council Bluffs, Iowa.

Hydraulic Pipe Pusher Lays Underground Pipe

871 Folder S-117 describes the types of underground pipe pushers manufactured by the Greenlee Tool Co., Division of Greenlee Bros. & Co., 2026 Columbia Ave., Rockford, Ill. A short trench accommodates the pusher, and expensive repaving is eliminated.

Locate Water and Oil Leaks

872 The M-Scope accomplishes the important job of locating underground leaks without requiring expensive digging. For a free six-page book, write the Fisher Research Laboratory, Inc., 1961 University Avenue, Palo Alto, Calif.

Truck-Mounted Centrifugal Pump Sprays Solid Stream Or Fog

873 American-Marsh Pumps, Inc., Battle Creek, Mich., wil send you information on its front-mounted, centrifugal pumps that may be adjusted to deliver either a solid stream or fog spray.

"Dual-ability" Blowers For Sewage and Water Plants

874 Bulletin 23-120-B10, issued by the Roots-Connersville Blower Corp., 900 West Mount St., Connersville, Ind., illustrates the meaning of dual-ability—the word coined by the manufacturers to explain its ability to provide rotary or centrifugal blowers, exhausters, boosters, liquid and vacuum pumps, and meters.

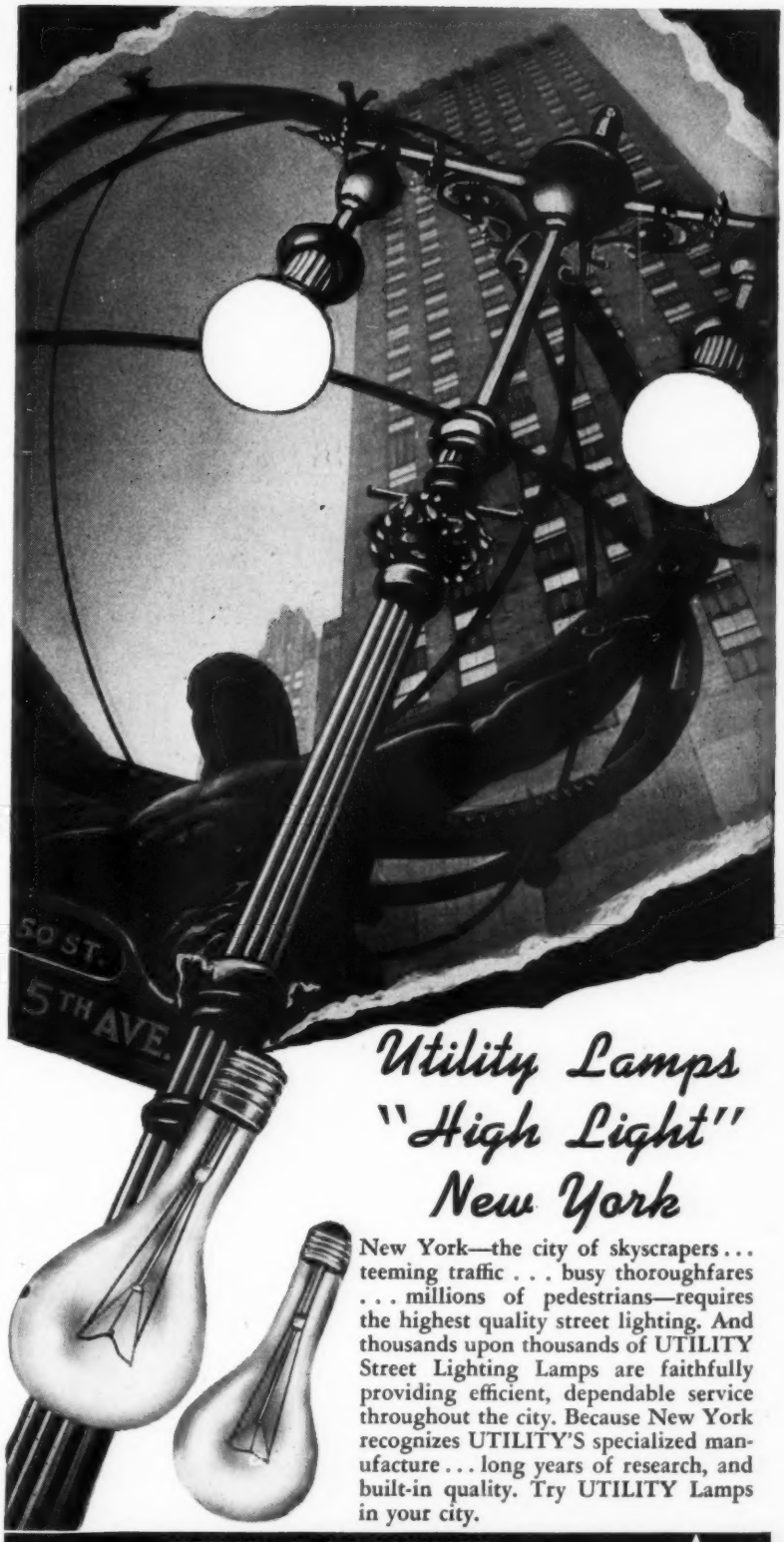
Gas-Diesel Sewage Engines

875 The Cooper-Bessemer Corp., Mount Vernon, Ohio, manufactures convertible gas or diesel engines for use in sewage treatment plants that may be converted instantaneously at full load, from one fuel to the other. Write for further information.

What Constitutes a Good Truck?

876 Ford trucks are available with either V-8 or Six engines, each with 4-ring pistons and precision bearings, with the rear axle shafts free of weight-load, ¾-floating and full-floating. For information write the Ford Motor Co., Detroit, Mich.

(*Continued on Page* 30)



Utility Lamps "High Light" New York

New York—the city of skyscrapers . . . teeming traffic . . . busy thoroughfares . . . millions of pedestrians—requires the highest quality street lighting. And thousands upon thousands of UTILITY Street Lighting Lamps are faithfully providing efficient, dependable service throughout the city. Because New York recognizes UTILITY'S specialized manufacture . . . long years of research, and built-in quality. Try UTILITY Lamps in your city.

UTILITY LAMP DIVISION

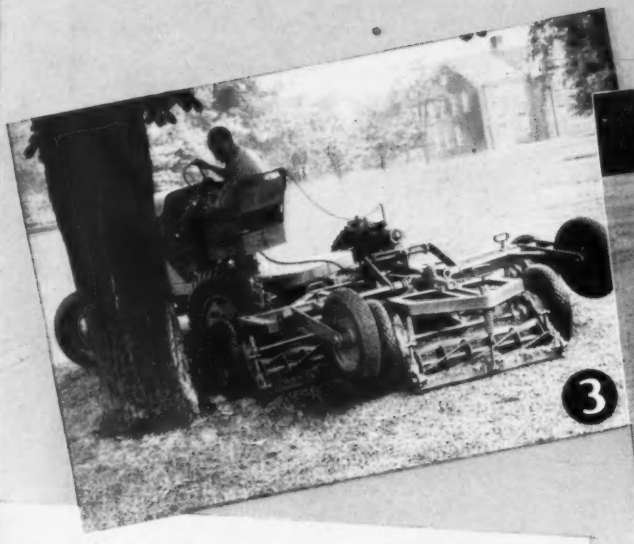
McHUGH PRODUCTS

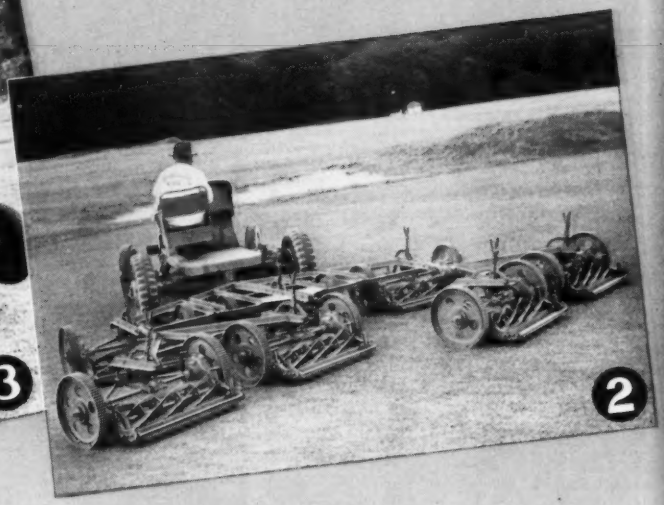
BROOKLYN, NEW YORK

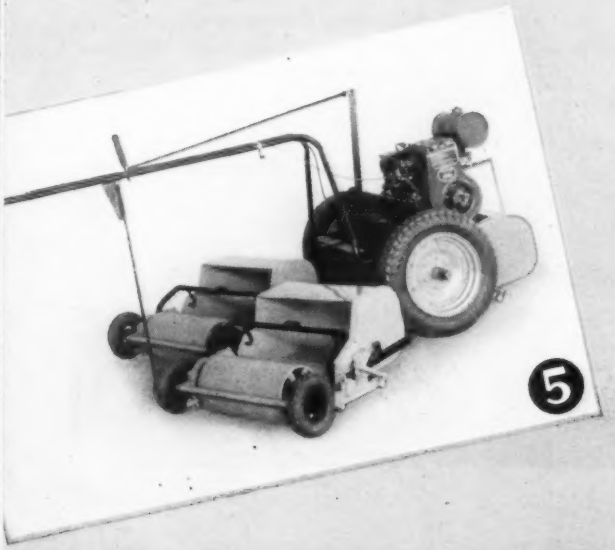
SUCCESSOR TO SLATER ELECTRIC & MFG. CO.

For Every Large Area Grass

WORTHINGTON S







1 "CHIEF" TRACTOR

This rugged, powerful tractor is specifically engineered to team up with gang mower units for fast, economical work. Powered by a 100 hp. Chrysler industrial engine, the "Chief" has four forward speeds from 7.5 to 47.5 m.p.h.—a complete range for every working condition.

2 STANDARD FAIRWAY MOWER

Available in 3, 5 or 7 gang units, the fast-working Worthington Fairway gang mower maintains golf fairways and other large grass areas with a minimum of labor, time and cost. Individual gang units may be quickly added or withdrawn and the gang can be easily attached to any type of wheel tractor.

3 RANGER

The Ranger attachment consists of a Worthington Grass Blitzer type triple gang mower with its own hydraulically operated transportation wheels. A touch of the control lever and the entire gang mower is lifted and the transport wheels set down. Its 7 foot cutting swath (3 — 30″ units) makes quick work of cutting jobs at parks, cemeteries, estates, institutions and highways.

4 GRASS BLITZER

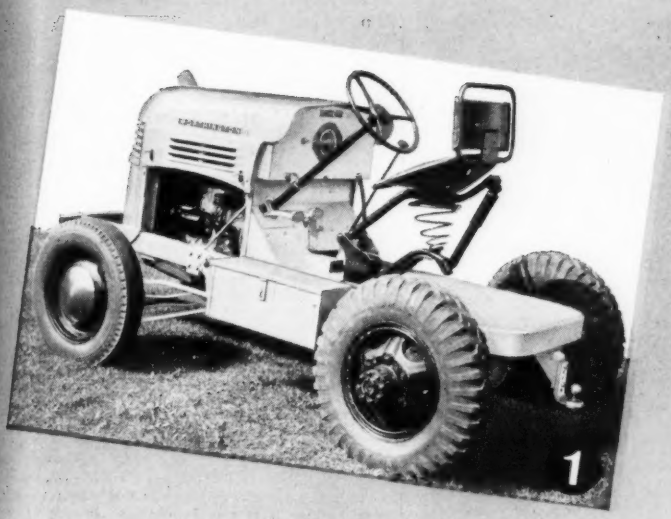
The 9 gang is capable of mowing 46 acres per hour at a speed of 20 miles per hour. Ruggedly built for duty on airfields, golf roughs and road approaches, the sturdy "Grass Blitzer" is available in 3, 5, 7 and 9 gang units — a size and capacity to fit any need. The 10″ reel with 4, 5 or 6 blades will answer the needs of your own local conditions.

5 OVERGREEN

A combination greensmower, tee mower, gang mower and utility tractor, the Overgreen disposes of cutting jobs quickly and thoroughly at a minimum of cost and effort. It is particularly effective on greens where its speed, capacity and efficiency really lighten the maintenance load.

ss Cutting Job, There's a

SPECIALIZED MOWER



DELIVERS FAST, LOW COST MAINTENANCE OF

- ★ PARKS
- ★ HIGHWAYS
- ★ CEMETERIES
- ★ PRIVATE ESTATES
- ★ SCHOOLS—COLLEGES
- ★ INSTITUTIONS
- ★ AIR FIELDS
- ★ GOLF COURSES

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STROUDSBURG, PENNSYLVANIA

Subsidiary of JACOBSEN MANUFACTURING CO., RACINE, WISCONSIN

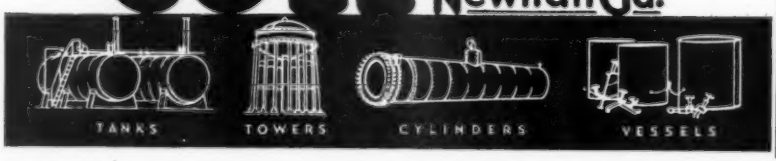
XUM

COLE TANKS

Cole elevated tanks are *correct* in design. Their simplicity contributes to their low cost of maintenance. Capacities 5,000 to 2,000,000 gallons — with hemispherical, ellipsoidal or conical bottoms. Also flat tanks for storage of butane and propane gas. Correctly built, in accordance with ASME specifications.

We invite your inquiries. A large and experienced engineering department is at your service. State capacity, height to bottom and location.

R.D. COLE MFG. CO. Newnan Ga. ESTABLISHED 1854



Check and Mail

Use Coupon on Page 21

Easy Access to Valve Parts

877 Clayton valves are manufactured so as to provide accessibility to all working valve parts placed on top of the valve rather than underneath. Write to Clayton Mfg. Co., El Monte, Calif., for information about the company's line of remote and float control valves.

Manometers That Measure To 1/100 Inch

878 Simplex Type MAP manometers incorporate six features to give accurate readings: large-diameter gauge glasses bored to produce a flattened meniscus; scale permitting deflection readings of 1/100 inch; mercury dampening valve drain and filling plugs; air venting and equalizing valves. Send for Bulletin 200, Simplex Valve & Meter Co., 6789 Upland St., Philadelphia 42, Pa.

How to Seal Pipe Joints

879 TMC pipe joint compound is applied manually with a trowel on top of a brush coating of primer. Heating is not required, and the compound is flexible enough to absorb the ordinary stress of slight deflections. This compound is also used to seal pipe joints in construction work. For the details, write the Thompson Materials Corp., 204 West St., New York 13, N. Y.

Valves That Require No Floats

880 Golden-Anderson altitude control valves need no floats for their installation, and can maintain water levels within 3-inch to 12-inch variation. For information about the many services that may be obtained by use of the valves with auxiliary equipment, write the Golden-Anderson Valve Specialty Co., Pittsburgh 22, Pa.

Control Devices Keep Plant Operation Smooth

881 Catalog 8302, issued by The Brown Instrument Co., Wayne, & Roberts Aves., Philadelphia 44, Pa., contains information on the company's products of control devices for measuring temperatures, pressures, flows, liquid levels, and humidity.

Weeds Can Be Controlled

882 The Sherwin-Williams Co., Cleveland, Ohio, will send you an illustrated folder indicating the most efficient methods of using Weed-No-More, a 2,4-D product. For literature, or a 17-minute 16mm color sound movie available for showing to municipal officials and other groups, write Sherwin-Williams.

Paint Baking That's Weatherproof

883 Jensen's infra-red, "dual heat" paint-baking ovens yield a finish that stays on, whether it is hot or cold, dry or damp. Ovens will be designed, engineered, and built to your particular needs. Write Jensen Specialties, Inc., 9331 Freeland, Detroit 27, Mich.

How to Get Soft Water

884 The Refinite Corp., Refinite Bldg., Omaha 8, Nebr., will send you literature about its line of equipment which can help your municipality to get soft water at a minimum cost. Also available is information about swimming pool equipment.

Radiotelephone for Municipal Use

885 The two-way radiotelephone has been found invaluable for use on police, fire, and repair units and ambulances. For information on how these radiotelephones may be used in your municipality, write to Motorola, Inc., Communications and Electronics Div., Chicago 51, Ill.

BRIDGEPORT DURONZE*

FOR WATER METERS

Photo Courtesy
Hersey Manufacturing Company
Boston, Mass.

Tensile strength over 90,000 psi.

Non-rusting, can be used over and over again.

BRASS • COPPER • BRONZE

DURONZE • CUPRO NICKEL

NICKEL SILVER

Strip • Rod • Wire • Tubing

For Longer Life and Reduced Maintenance

To reduce maintenance costs, a necessary evil since meters must be periodically opened for cleaning and adjustment, the Hersey Manufacturing Company, for a number of years, has standardized on Duronze bolts and nuts for their water meters in the domestic sizes.

Duronze bolts and nuts average about 90,000 p.s.i. in tensile strength, and are considerably stronger than those made from steel or brass. They are non-rusting and have great resistance to season or stress corrosion cracking. Bolts are made from hard drawn Duronze (silicon bronze) wire by the cold heading and rolled threading process.

Acorn nuts are machined from Duronze III rod (silicon aluminum bronze) which is about 9% lighter in weight than brass. After assembly the bolts and nuts do not "freeze" and can be used over and over again, saving much maintenance time and material.

Duronze modern engineering alloys have done much to improve products and prolong their useful service life. Water company and city engineers should insist on the use of Duronze alloys where corrosion and wear take their toll of inferior metals. We do not make bolts or nuts but supply wire, rod, tubing and strip to manufacturers. Consult our Technical Service Department and write for your copy of the Duronze manual. **Trade-mark Reg. U. S. Pat. Off.*

"Bridgeport" BRIDGEPORT BRASS COMPANY • *Established 1865* • BRIDGEPORT 2, CONN

Duronze Alloys—PRODUCTS OF

BRIDGEPORT BRASS

New! THIS B G HIGH

..Coordinated Equipment for Finest Bituminous Mixing Performance

The B-G Method of bituminous mixing has for years proved its superiority.

Now Barber-Greene presents more new and important time-and-cost-saving advantages in this latest B-G Central Mixing Plant equipment.

Barber-Greene engineers have developed a new, simplified drive system. Power is transmitted from a central power unit—through shafts—to the Dryer, Cold Elevator, Reciprocating Feeder, Hot Elevator and Gradation Control Unit.

4-bin Gradation Unit with 3½-deck vibrating screen provides new ease and flexibility of multiple aggregate control. Aggregate calibration and bin sampling have been simplified. Convenient hoisting device makes it easy to erect Hot Elevators and screen.

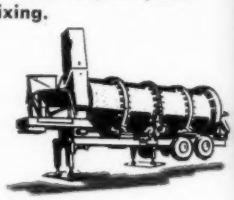
The need for pits for Hot and Cold Elevators has been eliminated.

All these—and others—are features you want, and what you'd expect of Barber-Greene, the pacesetter in better bituminous mixing.

..New PORTABILITY!

Semi-Trailer Mounting on Model 837 Dryer and Model 866 Gradation Control Unit; Model 880 Hot Elevators have removable pneumatic-tired dolly for towing; all units designed for maximum portability, flexibility, ease and speed of erection.

..New CONVENIENCE!



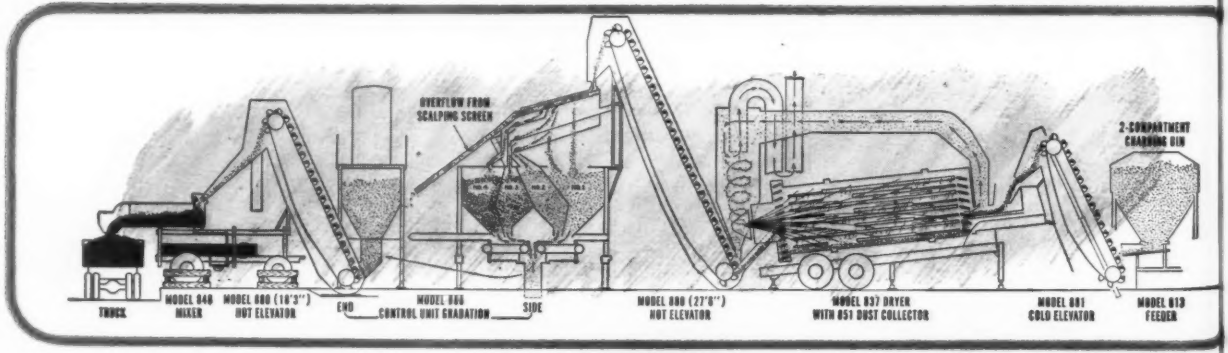
No Foundations. Adjustable jack-legs eliminate time-wasting cribbing. The 837 Dryer shown above is a single-drum, high-capacity unit with high roto-elevator discharge.

No Elevator Pits. Hot and Cold Elevators operate from ground level.

FROM 80 TO 120 TONS PER HOUR

That's what you can do with this new B-G Central Plant. Flow Chart below illustrates the B-G Continuous Flow Method: measured volumetric aggregate content, metered bitumen supply, controlled temperature and thorough twin-pugmill mixing to assure proper coating of aggregate—these are coordinated by B-G engineered equipment.

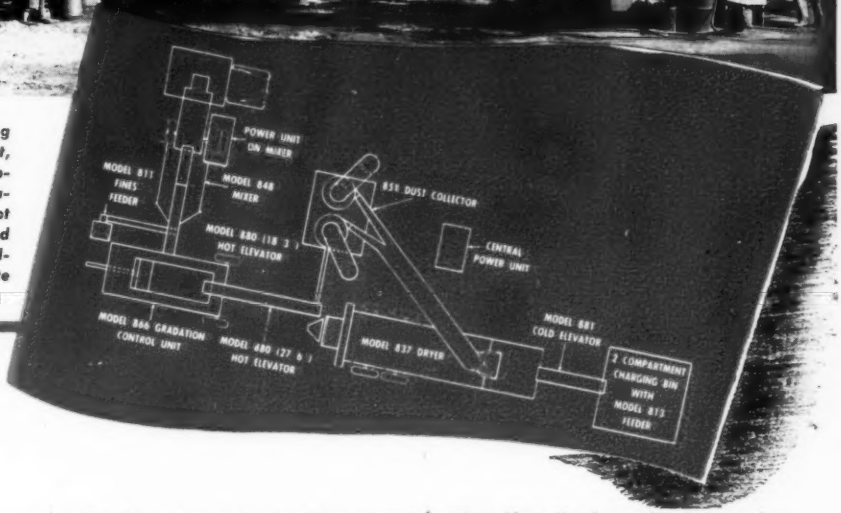
For your specific requirements, combinations of a wide variety of B-G Units and Auxiliary Equipment are available. Finding the best combination for you calls for close consultation with your B-G distributor. He can call on factory experts: together you'll get the right equipment and accessories to do the job you're figuring on.



CONSTANT FLOW EQUIPMENT

Barber-Greene

CAPACITY PLANT!


POWER UNIT ON MIXER
MODEL 811 FINES FEEDER
MODEL 848 MIXER
85ft DUST COLLECTOR
MODEL 880 (18 3') HOT ELEVATOR
CENTRAL POWER UNIT
MODEL 881 COLD ELEVATOR
MODEL 866 GRADATION CONTROL UNIT
MODEL 880 (27 6') HOT ELEVATOR
MODEL 837 DRYER
2 COMPARTMENT CHARGING BIN WITH MODEL 813 FEEDER

Here's a typical B-G "High-Type" Mixing Plant set-up with Gradation Control Unit, utilizing B-G Coordinated Auxiliary Equipment. For Intermediate-Mix Plant, Gradation Unit and second Hot Elevator are not needed. Dual classification of undried aggregate may be obtained with B-G adjustable 2-gate Reciprocating Feeder. Note that the B-G Method is flexible.

THESE B-G ADVANTAGES will interest You

- ***High Discharge** Dryer which eliminates Hot Elevator pit. Positive charging feeder on Dryer prevents bridging of stable mixtures.*
- ***Shaft and gear box** drives, with sealed antifriction bearings and fewer power units.*
- ***Four-bin aggregate** separation — your choice of 2, 3 or 4-aggregate gradation.*
- ***Instantaneous bin sampling** and simplified calibrating facilities.*
- ***Speedier, easier erection** and dismantling; semi-trailer mountings for greater portability.*
- ***Dual Cyclone Dust Collector** reclaims fines from Dryer exhaust gases and reduces dust nuisance.*
- ***New Fines Feeder** makes it convenient to add a measured proportion of fines.*
- *Extensive application of antifriction bearings.*
- *Lower Maintenance Costs.*
- ***Barber-Greene Experience:** broadest background in practical application of this most advanced bituminous mixing method. It is at your service—through your B-G distributor.*

See the distributor near you, or write to Barber-Greene, Aurora, Ill. for descriptive literature.

Barber-Greene

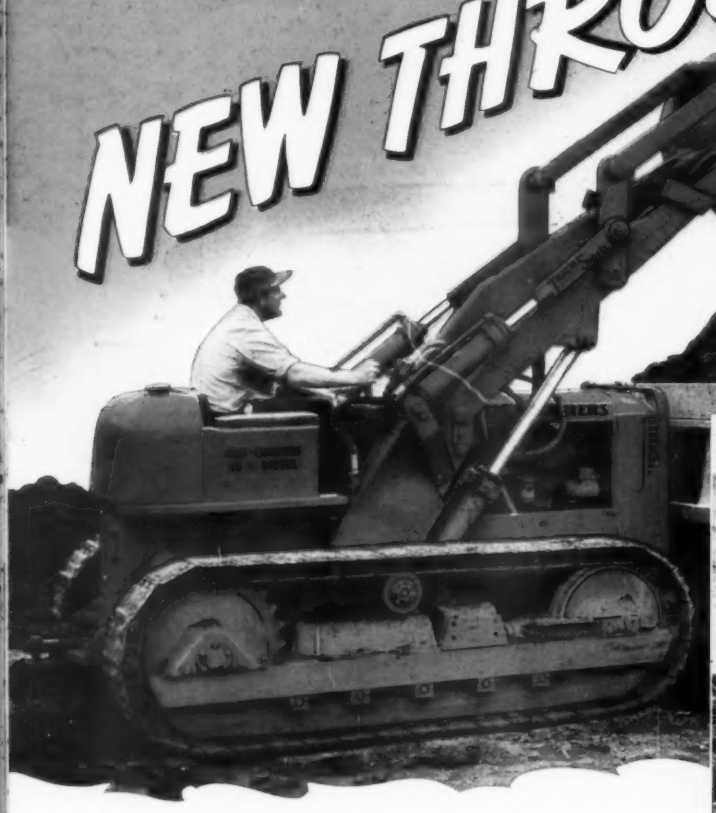
AURORA, ILLINOIS

ALLIS-CHALMERS HD-5

NEW THROUGHOUT

COMPLETELY NEW IN DESIGN

37.5 Drawbar Hp.
Weight,
Approximately 11,000 lbs.
2-Cycle
GM Diesel Power



NEW PERFORMANCE...NEW WORK CAPACITY...NEW SIMPLIFIED SERVICING

Instant starting.

Quick pick-up.

Fast maneuvering.

Comfortable operation.

Rugged and dependable.

Increased lugging ability because of built-in characteristics of General Motors 2-Cycle Diesel engine.

More footing and greater traction to handle larger loads under a wider range of conditions.

Tractor weight balanced for most efficient drawbar and front-mounted equipment use.

Tractor construction permits separate and convenient removal of major assemblies.

Greasing intervals lengthened—1,000 hours for truck wheels, front idlers and support rollers.

Lubrication fittings reduced in number and made readily accessible.

Adjustments easily reached and quickly made.

Get the full story of this great, new diesel tractor from your Allis-Chalmers dealer.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

JOSLYN
Gives You

More Useful Light Per Watt

"UTILUX"
SUBURBAN LUMINAIRE
TYPE K

1 REFLECTOR
- Special high strength glass
- Specular *sealed-in* reflecting surface
- Cannot tarnish or corrode

2 HOUSING
- Cast aluminum
- Supports reflector
- Prevents damage

3 CUSHIONED MOUNTING
- Phosphor bronze springs
- Reflector snaps in and out of locked position
- Automatically positions on light center

4 HEAD
- Cast aluminum
- Inner or outer wiring
- Pipe thread or clamp mounting

5 SOCKET
- Medium multiple
- Calibrated adjustable support bracket
- For 200 watt lamps or smaller

Branch offices in principal cities

•

THE JOSLYN CO.
THE SOUTH EAST-JOSLYN CO.
SOUTHERN JOSLYN CO.
JOSLYN SOUTHWEST CO.
JOSLYN COMPANY OF CALIFORNIA
JOBBERS SUPPLY CO.

JOSLYN MFG. AND SUPPLY CO.

Complete Pole Line Equipment

20 NORTH WACKER DRIVE, CHICAGO 6, ILL.

ITS "LIFE EXPECTANCY"

"LIFE EXPECTANCY" is an insurance term meaning how long the average man can be expected to live. There is an interesting parallel in the life expectancy of man and of cast iron pipe. For, in recent years, the "life expectancy" of both has been *steadily revised upward!*

The lengthened life of man is attributable to progress in dietetics, medicine, and the purity of water supply.

The estimated efficient life of cast iron pipe has been steadily revised upward because of service records.

In evaluating bids it is standard practise to estimate the efficient life of cast iron pipe at 100 years *minimum.* Consulting and water works engineers base this estimate on the known records of cast iron mains in this country which have been in service for more than 100 years. Moreover, they know that this century-old pipe was cast by methods that were primitive compared to the highly-developed production techniques of today.

Nobody knows for sure what the "life expectancy" of cast iron pipe may prove to be. The earliest authenticated installation of a cast iron water main is still functioning after nearly 300 years of service.

CAST IRON PIPE

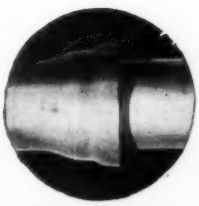
IS STEADILY RISING

Other installations in Europe are entering their third century of service. It is on these service records that the Cast Iron Pipe Research Association bases its slogan, *"Serves for Centuries."*

"Cast iron pipe not only offers a century or more of efficient life as a structure—it offers a century or more of efficient life as a carrier. In the limited areas with tuberculating waters, cement-lined cast iron pipe is tuberculation-proof and insures high carrying capacity for the life of the pipe. In the greatly predominating areas without tuberculating waters, the carrying capacity of unlined cast iron pipe remains practically unimpaired for the life of the pipe."

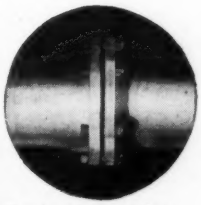
Cast Iron Pipe Research Association, T. F. Wolfe, Research Engineer, Peoples Gas Bldg., Chicago 3.

Joints for Cast Iron Pipe



Bell-and-Spigot Joint: the standard joint for water and sewerage service.

A variety of joints are available, of which the two most widely used are illustrated. Special purpose joints, such as the Ball-and-Socket, or Flexible Joint for underwater use, and the Flanged Joint for above-ground use, are also available.



Mechanical Joint: bottle-tight and flexible, now with interchangeable parts.

PIPE LINES

New York's Underground Empire

Approximately two million lengths of pipe of which more than 95% is cast iron pipe, distribute water to the five boroughs of New York City—upwards of 5,000 miles of distribution mains which, if laid in a straight line, would reach from New York to San Francisco and nearly half way back again—this is New York's "underground empire." These mains distribute more than 900,000,000 gallons of water per day. Some sources of supply are more than 100 miles distant.

A Billion Gallons Per Day

Chicago, from an inexhaustible supply, pumps more than a billion gallons a day through her one-and-a-half million lengths of pipe, 99.9% of which is cast iron pipe. The rated pumping capacity of Chicago's system is 1,900,000,000 gallons a day.

Fifteen Largest Cities

Here are some more typical figures giving the percentage of cast iron pipe used in the water distribution systems of the 15 largest cities in the United States, as recently reported by their Water Departments: Philadelphia, 98.3%; Detroit, 98.7%; Cleveland, 98.9%; St. Louis, 98.7%; Boston, 99.8%; Pittsburgh, 97.9%.

And In Treatment Plants

The wide acceptance of cast iron pipe is further evidenced by the fact that well over 95% of all the pipe in Water Filtration plants and Sewage Treatment plants, throughout the United States, is cast iron pipe. Under the ground, above ground, under water or set in concrete, cast iron pipe is the standard material.

Still Going Strong

Original cast iron mains have in some instances been abandoned or salvaged when it became necessary to replace them with larger-sized cast iron pipe. Nevertheless, a recent survey shows that some or all of the original cast iron water mains are still in service in 200 out of 212 of America's large cities; impressive evidence of long life and economy.

SERVES FOR CENTURIES

BUILDING NEW ROADS AND STREETS IN NEW HOUSING AREAS IS A Job for TRAXCAVATORS

IT'S THE PROFITABLE WAY TO DO IT!

THERE'S ONE SURE WAY to hold down costs and keep up with demands for road and street building and improvement in the many new housing areas in your community . . . TRAXCAVATE, the modern earth-moving and material handling method.

TRAXCAVATORS are powerful tractor-shovels that are truly all-purpose construction tools. They dig, load, grade, bulldoze, level, strip, carry and haul . . . in fact *they do more different* kinds of *jobs at lower cost* than any other machine of comparable size, power and capacity.

Their direct, powerful digging action gets the job done quickly . . . whether it's in old broken concrete, asphalt surfacing, packed gravel, or tough virgin soils like clay or caliche.

TRAXCAVATORS, powered by "Caterpillar" track-type tractors, are available in four sizes with bucket capacities from ½ to 2½ cubic yards. There's a size for every job and purpose. See your TRACKSON-"Caterpillar" dealer about time-and-money-saving ways to use TRAXCAVATORS, or write direct to TRACKSON COMPANY, Dept. AC-77, Milwaukee 1, Wisconsin.

TRAXCAVATOR

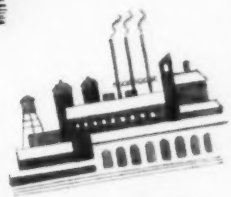
REG. U. S. PAT. OFF.

The Original-Tractor Excavator

for

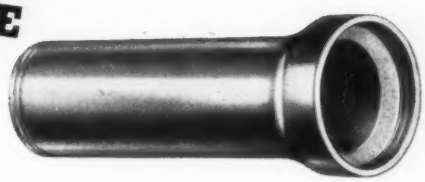
LONG TIME ECONOMY IN SEWAGE AND WASTE DISPOSAL

HERE



USE

DEPENDABLE ALL-PURPOSE CLAY PIPE



BECAUSE IT NEVER WEARS OUT

Far-sighted sanitary experts rely on Clay Pipe, because it contributes so much to the permanence and long-time economy of structures. Clay Pipe in today's plans will eliminate future "headaches." Clay Pipe is chemical-proof and abrasion-proof. It can be depended on to do its job year after year without crumbling, corroding or rusting. Ageless service, without replacements or maintenance caused by product failure, makes Clay Pipe the best there is for carrying sewage and industrial wastes.

A Modern Planning Tip: The many advantages of Extra Strength Clay Pipe are making it an "every day" material on large and small jobs. It is the new pipe for extra-heavy live or dead loads. On many jobs it eliminates the need for cradling or casement.

CLAY PIPE NEVER WEARS OUT!

CLAY PIPE

For information about Clay Pipe, write to:

NATIONAL CLAY PIPE MANUFACTURERS, INC.
111 W. Washington St., Chicago 2, Ill.
522 First National Bank Bldg., Atlanta 3, Ga.
1105 Huntington Bank Bldg., Columbus 15, Ohio
571 Chamber of Commerce Bldg.,
Los Angeles 15, Calif.

C-1146-48

It is going to be one of the biggest conventions in the industry—this first joint get-together of the AWWA and the Sewerage Works Association.

We of the R. D. Wood Company are looking forward to the event with keen anticipation. We expect to have a grand time—meeting old friends, some of them only lately back from the war; and making new friends.

As to our displays (Booth 45). A model of our Mathews Hydrant will be there, you may be sure, along with models and literature of our other products. Though we believe our hydrant to be the best-known in the world, we realize there are waterworks men who are not familiar with it. We'll gladly show you why we've been saying for so long it is the finest hydrant made; and why that's its reputation everywhere.

See you in San Francisco. Booth 45.

MATHEWS HYDRANTS

Made by **R. D. WOOD COMPANY**

PUBLIC LEDGER BUILDING, INDEPENDENCE SQUARE, PHILADELPHIA 5, PA.

MAKERS ALSO OF "SAND-SPUN" PIPE (CENTRIFUGALLY CAST IN SAND MOLDS) AND R. D. WOOD GATE VALVES

a WHAT for every WHERE and WHEN

Preventing and curing water-line headaches is largely a matter of having the right pipe joint or repair product for each specific need. Engineered to solve your problems, Dresser's complete line provides labor-saving, economical products for efficient and permanent pipe joining and repair.

WHERE DRESSER PRODUCTS CAN SERVE YOU

Here are some of the many installations on which Dresser Couplings and Repair Products can save you time, trouble and expense:

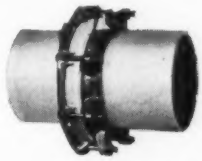
Water supply lines	Pumping stations	Sprinkler system piping
Distribution lines	Filtration plants	Sewer trunk lines
Intakes	Pump connections	Outfalls
Subaqueous lines	Penstocks	Force mains
Bridge crossings	Air conditioning piping	

LATEST DRESSER CATALOG

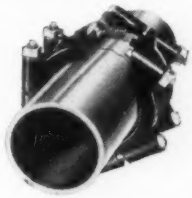
For detailed information on how Dresser products can simplify your pipe joining and repairing problems, write on your letterhead for a copy of the new No. 47 Dresser Catalog.

REPRESENTATIVE DRESSER PRODUCTS

Steel Couplings (Style 38) for joining plain-end steel and cast iron pipe. Sizes from ⅜" to 72" and up.



Adjustable Bell-Joint Clamps (Style 60) for repairing and preventing leaks in bell-and-spigot joints. Sizes 3" to 60" CIP.



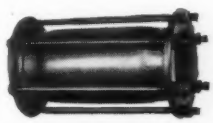
"Adjustable" Repair Sleeves (Style 82) for quick, permanent repair on cast iron lines. Sizes 4" to 8".

Split Repair Sleeves (Style 57C) for repairing breaks, splits and holes in CIP. Sizes from 2" to 12".

Bellmaster Joints (Style 85) for Bellmaster cast iron pipe. Fits inside bell. Sizes 3" to 12".

Malleable and Steel Saddles (Style 91) for service connections to steel and cast iron pipe. Sizes 1¼" ID to 20" OD.

Boltless Fittings—Style 90 for service lines—Style 65 for equipment piping—Style 88 for copper tubing. Sizes 2" and smaller.



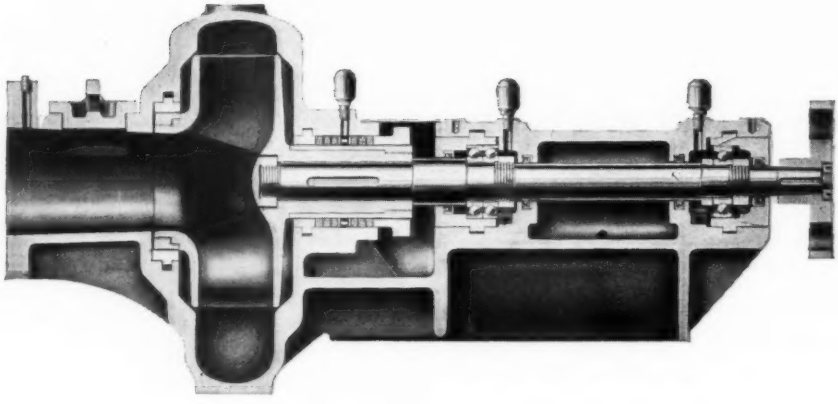
Long Sleeves (Style 40) to span gaps between pipe ends. Simplifies tie-ins. Sizes from ½" to 24".

DRESSER COUPLINGS and REPAIR PRODUCTS

ONE OF THE DRESSER INDUSTRIES

DRESSER MANUFACTURING DIVISION, BRADFORD, PA. • 1121 ROTHWELL ST., HOUSTON, TEXAS.
IN CANADA: DRESSER MANUFACTURING CO., LTD., 60 FRONT ST., W., TORONTO, ONTARIO

DE LAVAL
the
QUALITY
pump
in the Sewage Field



In order to withstand the severe service imposed upon a pump handling gritty, trash-filled water, De Laval Sewage Pumps are designed with the same engineering skill and manufactured to the same high standards as are the famous De Laval Water Works Pumps.

The casing of the De Laval clogless sewage pump is split on a plane with the axis to allow the cover to be lifted without disturbing piping connections. All parts are easily replaceable, including the shaft sleeve and also the renewable wearing rings at the running joint between impeller and casings. When wear occurs at the latter point, resulting in leakage from discharge to suction, efficiency can be easily restored by the installation of new rings.

Send for literature describing these and other quality features of the De Laval Clogless Sewage Pump.

CP-1

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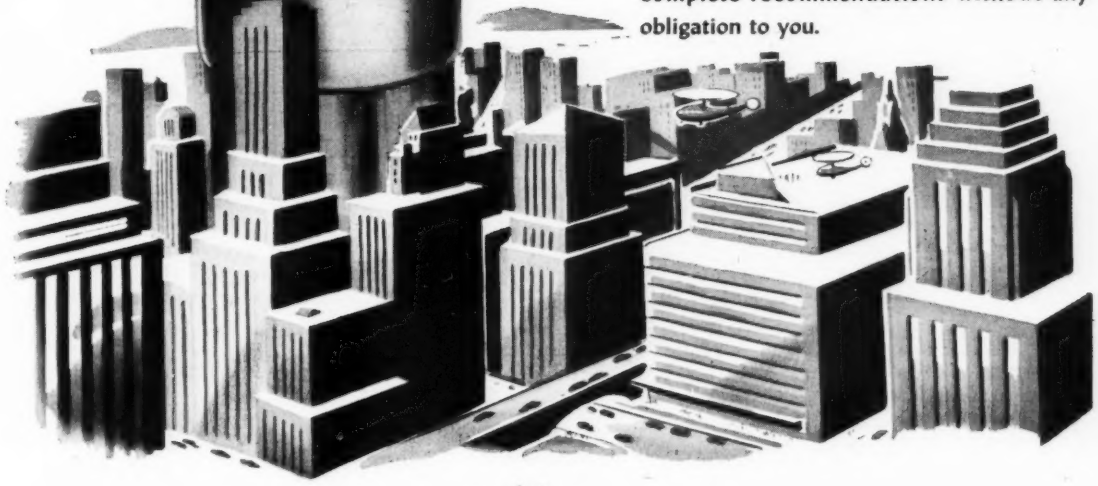
DE LAVAL STEAM TURBINE CO. • TRENTON 2, N. J.

TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS

PERFECTION

for your city

Second only to pride in one's home is pride in one's city. The "perfect city" will perhaps never be achieved, but every responsible official is constantly attempting to make his city most nearly perfect. Better parks, schools, public buildings, transportation and traffic control are all objectives toward perfection. Well regulated parking is vital to efficient prosperous business districts. Today cities most nearly achieving perfection in parking regulations have already installed Mark-Time Perfection Parking Meters. A Mark-Time installation engineer will gladly make a metered parking survey for your city in cooperation with your own traffic control officials, and submit complete recommendations without any obligation to you.



MARK TIME *Perfection*

the most perfect parking meter for your city

M. H. RHODES, INC., HARTFORD 6, CONNECTICUT

XUM

HEAVY-DUTY JOB?

Put it up to an FWD

THE TRUCK FOR *all* HEAVY WORK *all year 'round*

The powerful drive on all four wheels of FWD four-wheel-drive trucks, plus FWD truck engineering based on over 36 years of experience concentrated on four-wheel-drive, give these rugged, dependable trucks outstanding advantages in all phases of heavy-duty road construction and maintenance work.

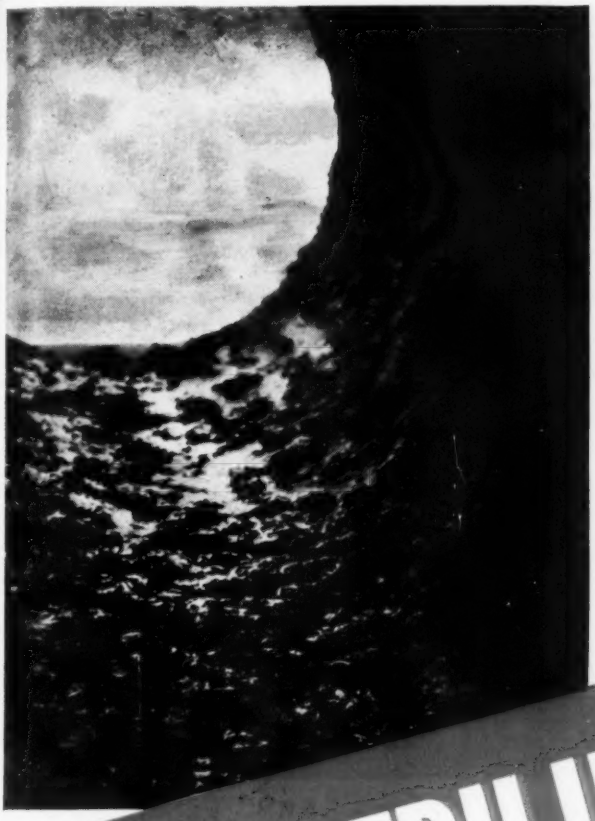
With underbody blade, the FWD has no equal for road patrolling—blading, grading, maintaining—fast, at low cost. All year 'round, heavy material hauling, heavy equipment transport, snow clearing, heavy emergency road work... all are done faster, safer, at lower cost, with FWDs—the ONE truck for MANY jobs. For complete information, see your nearest FWD Distributor or write to . . .

THE FOUR WHEEL DRIVE AUTO CO., CLINTONVILLE, WIS.
Canadian Factory: KITCHENER, ONTARIO

A 5-ton FWD Model SU patrolling rugged, winding Cameron Pass, Colorado. *At left:* An FWD Model HA, taking on a load of gravel . . . one of large South Dakota fleet used also for snow removal, as well as road construction and maintenance.

America's Foremost Heavy-Duty Truck

▸ PIPE LINING FACTS NO. 1 ◂



▸▸▸▸ **CENTRILINE** restores the original carrying capacity of old water mains at reasonable cost by the centrifugal application of a cement lining. This smooth, dense, continuous coating defies corrosion and tuberculation. Hence, carrying capacity is sustained for the lifetime of the main.

The ever-smooth, protective lining centrifugally applied by Centriline in some instances has increased carrying capacity beyond the rate of the pipeline when originally installed. This is due to the homogeneity of the lining which covers seams, joints and rivet heads.

If mains are losing their efficiency, consult with our experienced hydraulic engineers.

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CENTRILINE
PERMANENTLY INCREASES CARRYING CAPACITY

CENTRILINE CORPORATION

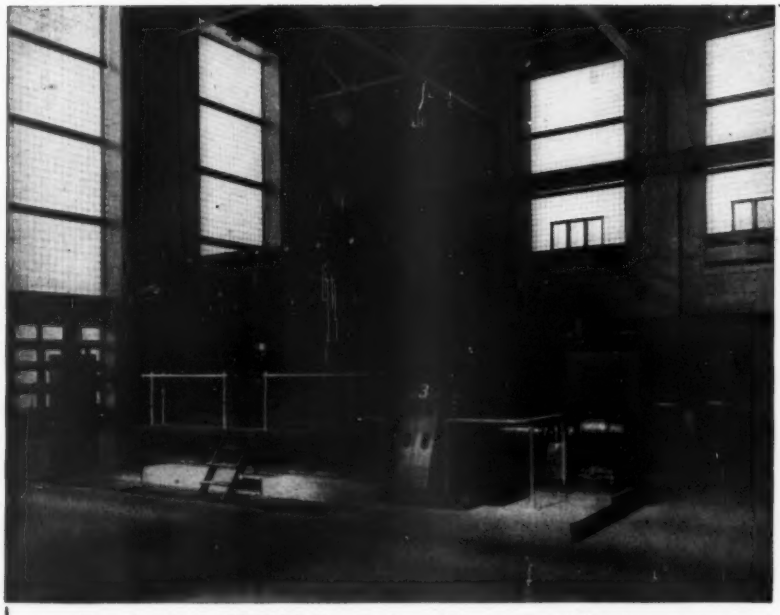
140 CEDAR STREET • NEW YORK 6, N. Y.

CENTRILINE PROCESS

CEMENT MORTAR LININGS FOR WATER MAINS

Centrifugally Applied

In Strict Conformity with A. W. W. A. Specifications



Two 4-cycle RATHBUN Gas Engines with water-cooled exhaust valves and oil-cooled pistons, each engine directly connected to a 560-kw generator. Note that the customary flywheel is absent, the generator rotor having been designed to supplant it.

These TWO **RATHBUN** Gas Engines

—using sewage digester gas for fuel—

generate electricity, which drives two motor driven pumps (one 21 and the other 42-mgd) also two 10,000-cfm blowers, in addition to auxiliaries with 200-hp load.

They are quiet and reliable and are designed for continuous service at their rated capacities.

The RATHBUN-JONES ENGINEERING CO., Toledo, Ohio

"GUNITE" CONCRETE

(Since 1915)

SPECIALISTS IN CEMENT GUN WORK

RESERVOIR LININGS (NEW AND OLD) • CONCRETE AND MASONRY REPAIRS • STEEL ENCASEMENT • FIREPROOFING • STEEL COAL BUNKER, STACK, HOPPER, AND PLATE LINING • SEWER LINING AND REPAIRING • CANAL, DITCH, AND DRAIN LINING.

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NO "LEAN YEARS" FOR WEEDS!

Order Your Supply of Weed-Killer *NOW*

DOLGE WEED-KILLER

Does a swift, efficient job where *no vegetation whatever* is desired. This Dolge-developed preparation kills weed tops, then penetrates to the roots, destroying the plants completely. It sterilizes the soil and prevents seeds from sprouting.

An hour's sprinkling with DOLGE WEED-KILLER equals six hours of weeding by old-fashioned, unsatisfactory methods. Do the job once and do it *right* at a terrific saving of money.

E. W. T. *SELECTIVE* WEED-KILLER

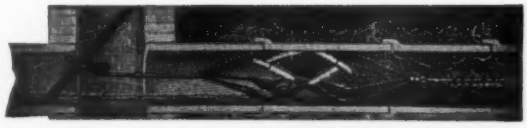
Acts on weeds but is not injurious to most grasses, nor does it sterilize most soils. One cupful to eight gallons of water is the usual solution for ridding turf areas of dandelions, plantains and other hardy weeds.

Non-poisonous to humans and domestic animals . . . will not corrode metal sprinkling and spraying equipment. Use freely on roadsides to control poison ivy. Use for ragweed control.

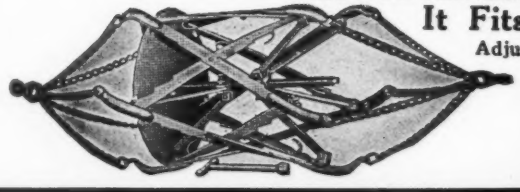
Write for complete literature, with full directions for applying these tested Dolge products.

The C. B. DOLGE CO. WESTPORT, CONNECTICUT

EXPANDING ROOT CUTTER & SEWER CLEANER



Open and in action removing roots and caked sediment like this.



It Fits in on Every Sewer Cleaning Job

Adjusted in 30 seconds to fit any sewer from 8 to 30 inches.

Will clean the entire sewer wall, top, and sides as well as the bottom, cutting and removing the roots and caked sediment, putting the sewer system in almost 100% clean condition.

Write for our new catalog on complete sewer cleaning equipment.

EXPANDING SEWER MACHINE COMPANY

108 East Walnut St. **Nappanee, Ind.**

WARD MOTOR TRUCKS LA FRANCE

"FOR HEAVY HAULING JOBS, GIVE ME A BIG WARD LA FRANCE"

The enviable reputation for stamina and reliability has been gained by Ward LaFrance through actual performance. Ask the men who drive these *big* trucks.

For heavy hauling operations, the big, new Ward LaFrance trucks and over-the-road tractors are the economical answer. There is plenty of reserve power in the rugged, dependable engine, and extra-load capacity is made possible by heavy duty construction throughout—two of the reasons why Ward LaFrance is the truck for your heavy duty hauling. Buy the *big* truck with the *extra* power and pay-load capacity.

Write Ward LaFrance today for full information about these trucks and discover how you can get maximum performance at lowest cost.

Look for the big truck with the exclusive "flat top" fender

WARD LAFRANCE TRUCK DIVISION - Great American Industries, Inc., Elmira, N. Y.

Roads Must Take a Beating
... but WHY SHOULD YOU?

LITTLEFORD SAVES YOU MONEY

Speed and efficiency are built into every unit of equipment that Littleford produces for the construction and maintenance of black top roads. From the big Spray Masters that lay it down in any width up to 24 feet, right through the line to the most inexpensive spray kettles, Littleford equipment moves faster, heats faster, operates faster. For almost fifty years Littleford have engineered and designed simplified units for every function in heating and application. Save yourself some money by getting the facts about the entire Littleford line. Write for Catalog W.

BLACK TOP ROAD MAINTENANCE EQUIPMENT LB SINCE · 1900

LITTLEFORD

LITTLEFORD BROS., Inc.

500 E. PEARL ST., CINCINNATI 2, OHIO

MAKING GOOD SIGNS--BETTER

America's Finest Complete Traffic Control Sign Line

Rust-Proofed By Galvanizing On Bonderized Steel

Reduce accidents with the sign that's always improving. Standard line or specials to your specifications.

Reflectorized or plain embossed, with glass or lucite buttons. Write for your copy of the new catalog TODAY.

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MIRO-FLEX COMPANY

1824 EAST SECOND STREET · WICHITA, KANSAS

AMERICA'S SERVICE MEN ROLL WITH AMERICAN EQUIPMENT

● *What makes service trucks different from standard trucks?*

The service man has the answer. He knows how important it is to have the right tools at the right place at the right time.

American Bodies provide a place for everything. They have shelves, hooks, trays, drawers, boxes, nooks, corners, and plenty of space for the hundred and one tools needed on a job.

Different service jobs require different kinds of bodies. American makes several models for the power, light, telephone, water and gas utilities, and other industries. The American line of bodies includes:

Line Service, Maintenance, General Service Meter Installation, Utility, Crew Compartment.

American also has a complete line of overhead equipment, including the revolving aerial ladder, Tower Lift, and Seagrave.

When service men roll with American, they always have all the tools they need to do the job.

PRODUCTION RECORDS SMASHED!

Production of American bodies continues at the highest rate in our 30-year history. Each month sees new production records. But unprecedented demand slows our deliveries. We are doing everything in our power to satisfy your requirements for American bodies.

ACB and

THE American COACH and BODY COMPANY

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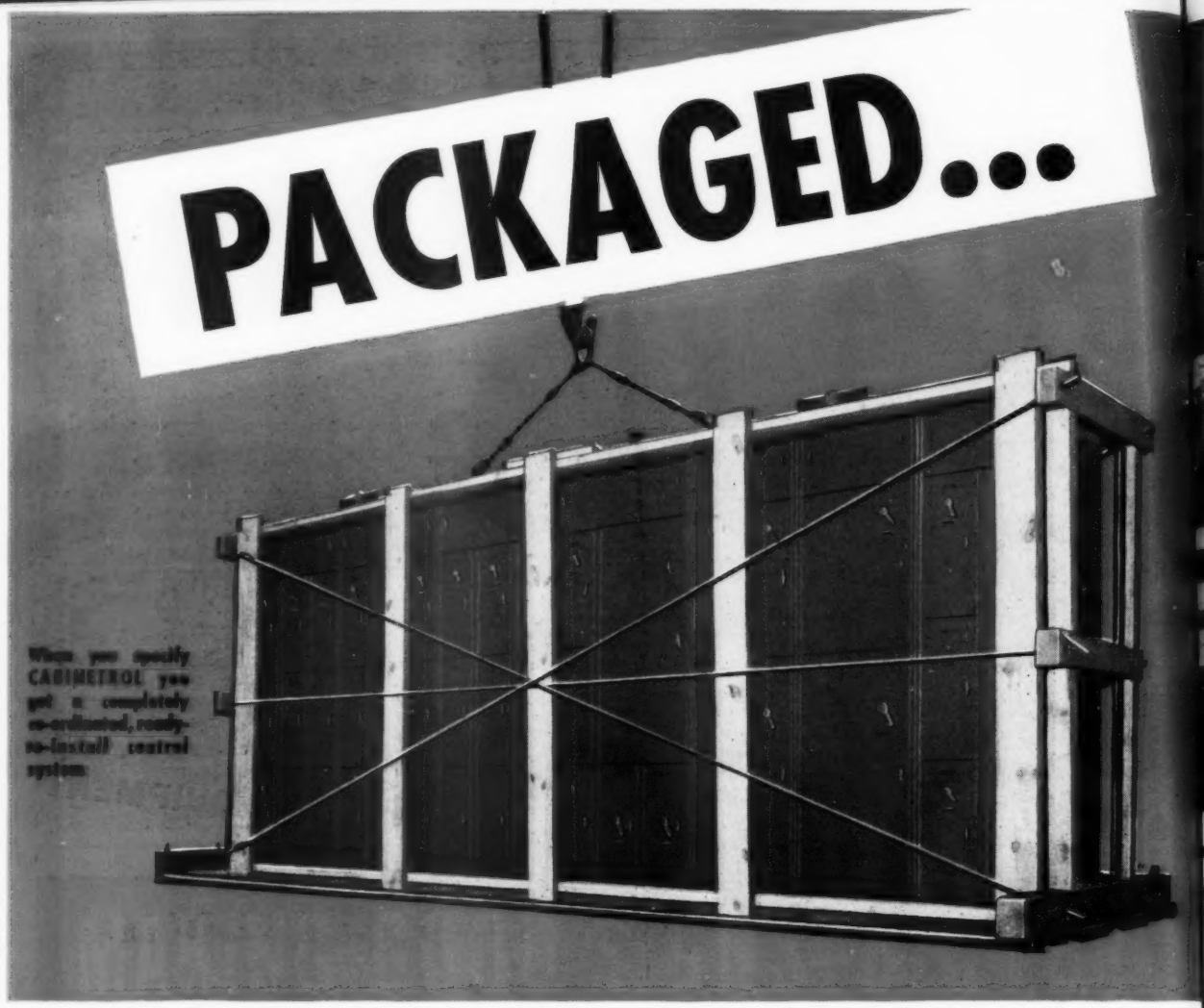
SALES and ASSEMBLY THE AMERICAN COACH AND BODY CO. OF CALIF., 432 FIFTH ST., OAKLAND 7, CALIF.
BAKER EQUIPMENT ENGINEERING CO., SUMMIT & NORFOLK STS., RICHMOND 11, VA.

OFFICES 350 MADISON AVE., NEW YORK 17, N. Y. INSURANCE EXCHANGE BLDG., DES MOINES 9, IOWA



Here's why sewage and waterworks *operators* prefer CABINETROL—General Electric's *factory-assembled* control

1 NEATER: All components completely enclosed, all exterior surfaces flat and uniform, easy to keep clean; one attractive color.

2 SAFER: Compartments secured with lock and key, no exposed bus bars or wiring; safety lock-outs on breakers to prevent injury during remote repairs.

3 MORE ACCESSIBLE: Hinged doors—no screws—facilitate frequent inspection and cleaning, troubles spotted before they become serious.

4 LESS SUPERVISION: All control functions centralized, all plant operations checked at a glance.

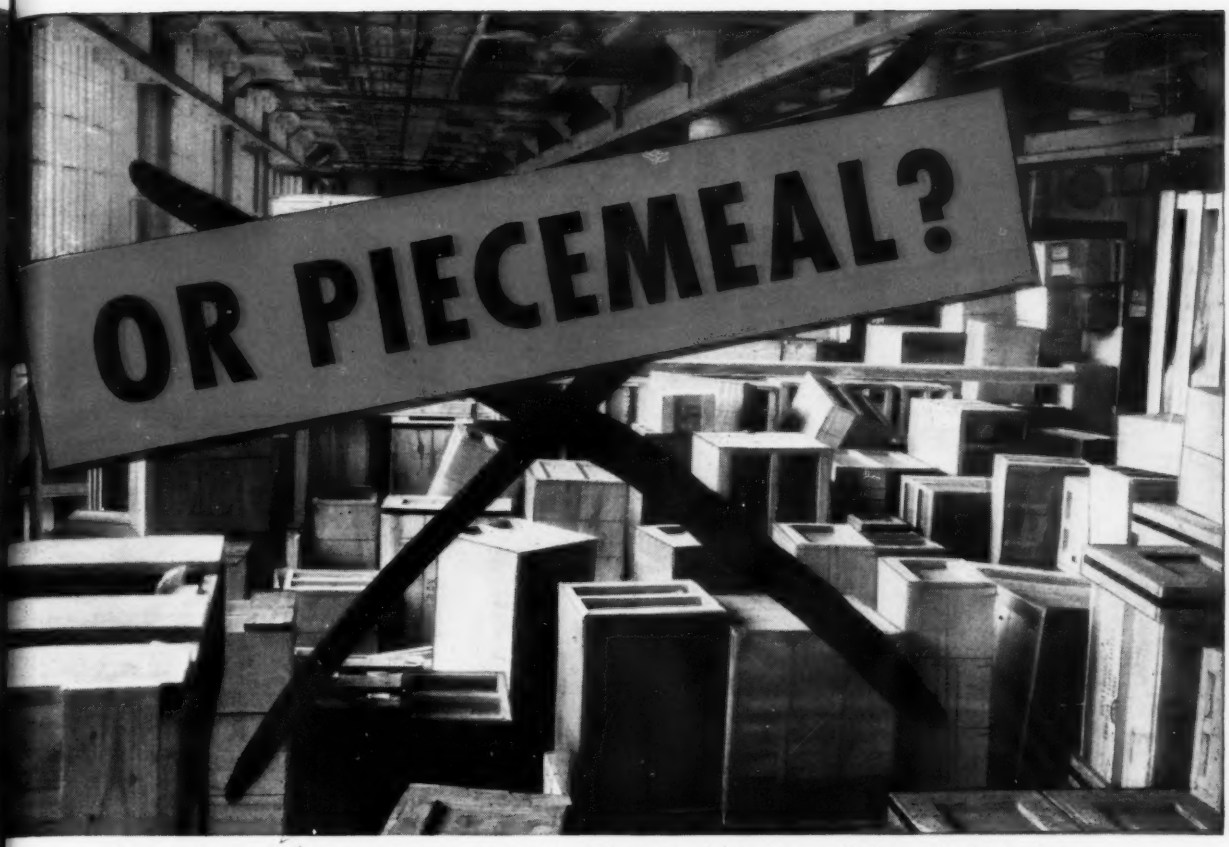
5 EASIER INSTALLATION: Cabinetrol is factory-assembled, co-ordinated and tested. Simply set it in place, connect incoming and outgoing leads.

6 SIMPLER: Cabinetrol can centralize in one location these and many other devices: flow meters, motor controls, level controls, temperature meters, alarm circuits, generator control, metering for light and power circuits, feeder circuits to outlying buildings—even a clock.

7 LESS SPACE: Cabinetrol can be built into a wall between two adjoining rooms in a plant.

8 EASILY ENLARGED: Can be expanded as plant grows, without losing uniformity.

CO-ORDINATED WATER-PLANT...SEWAGE-PLANT ELECTRIFICATION



Control equipment ordered piecemeal means installation headaches, wiring headaches, co-ordination and testing headaches

These Cabinetrol Advantages Appeal to CITY OFFICIALS

1 LOWER INSTALLED COST: The Cabinetrol on the opposite page actually cost less installed than the comparable made-up assortment of individual controls shown above. And it is costing less to maintain.

2 PRE-ENGINEERED: State your requirements functionally—with a one-line diagram if you wish—General Electric engineers do the rest. They will make up a Cabinetrol unit tailor-made to your particular requirements, *but* using standardized components—that's where you save.

3 UNIT RESPONSIBILITY: If you elect to purchase all the electric equipment for your new sewage or waterworks plant from General Electric, including Cabinetrol, motors, unit substation and cable, we will assume the added responsibility for the co-ordination and supervision during installation of all this electric equipment—thus simplifying your engineering, buying, installation and servicing because you're dealing with only one manufacturer. Giving unit responsibility to one manufacturer assures you of getting a completely co-ordinated engineering job . . . and getting shipment dovetailed to your building plans.

To save time and get the most for your electrical dollar, call in your General Electric representative *early.* By considering your electrical requirements *while you are still in the planning stage,* you will wind up with co-ordinated architectural, mechanical and electrical plans that will assure less costly construction and a plant that will look better and stay modern longer. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

MARK JULY 21-24 on your calendar . . .

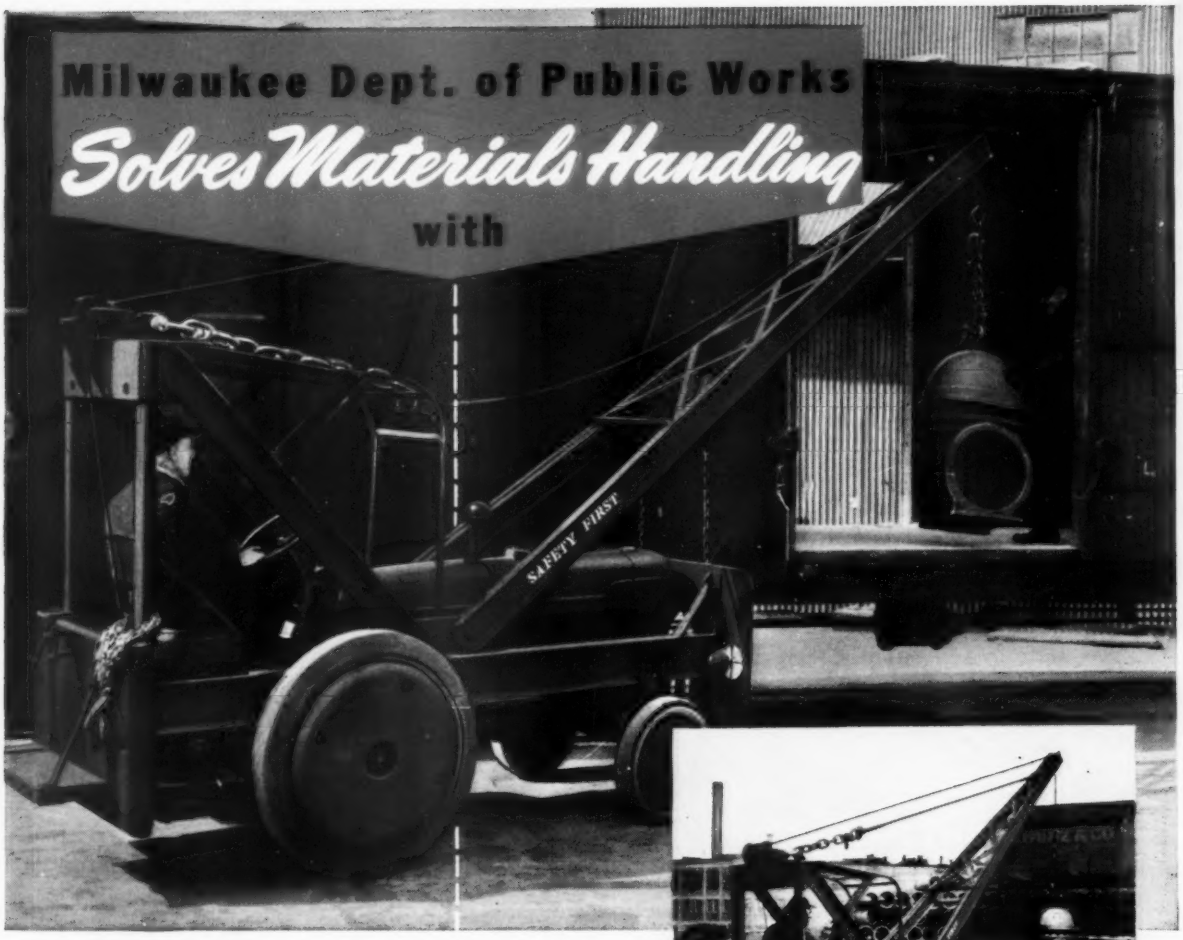
that's the date for the 20th annual meeting of the Federation of Sewage Works Associations and the 1947 conference of the American Waterworks Association in San Francisco. Plan to attend and be sure to visit the General Electric exhibit where Cabinetrol and other G-E products will be available for your inspection.

GENERAL ELECTRIC

Milwaukee Dept. of Public Works

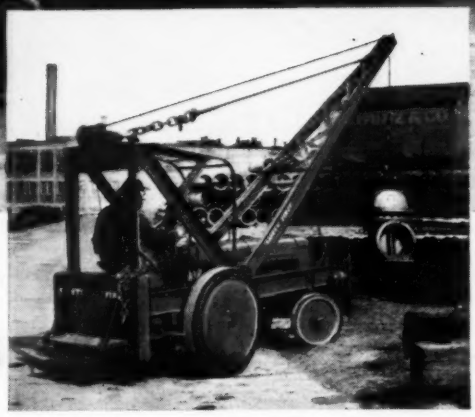
Solves Materials Handling

with



INTERNATIONAL

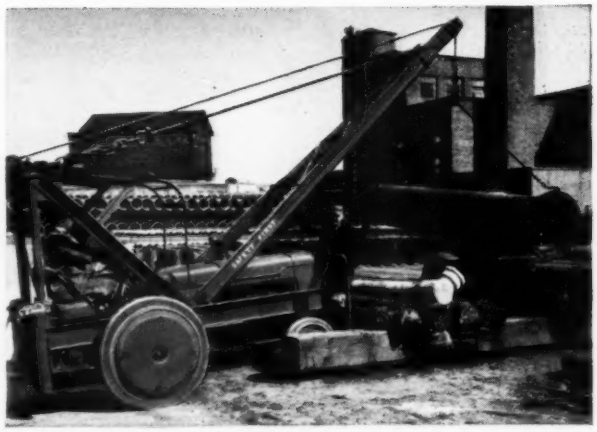
Industrial Wheel Tractors



Two International I-4 Tractors do the heavy lifting and materials handling around the Municipal Service Building in Milwaukee. One is shown in these views unloading and stockpiling a 16-in. gate valve weighing 1300 lbs. and a 12-ft. length of 24-in. pipe weighing 2400 lbs.

The crane-equipped tractors stockpiled everything in this water department yard. The department liked them because "they are faster and easier to handle than the cranes used before."

Consult your International Industrial Power Distributor about these and other International tractors. Let him help you select the models required for your jobs.



Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

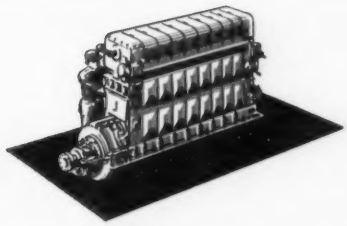
180 North Michigan Ave., Chicago 1, Illinois

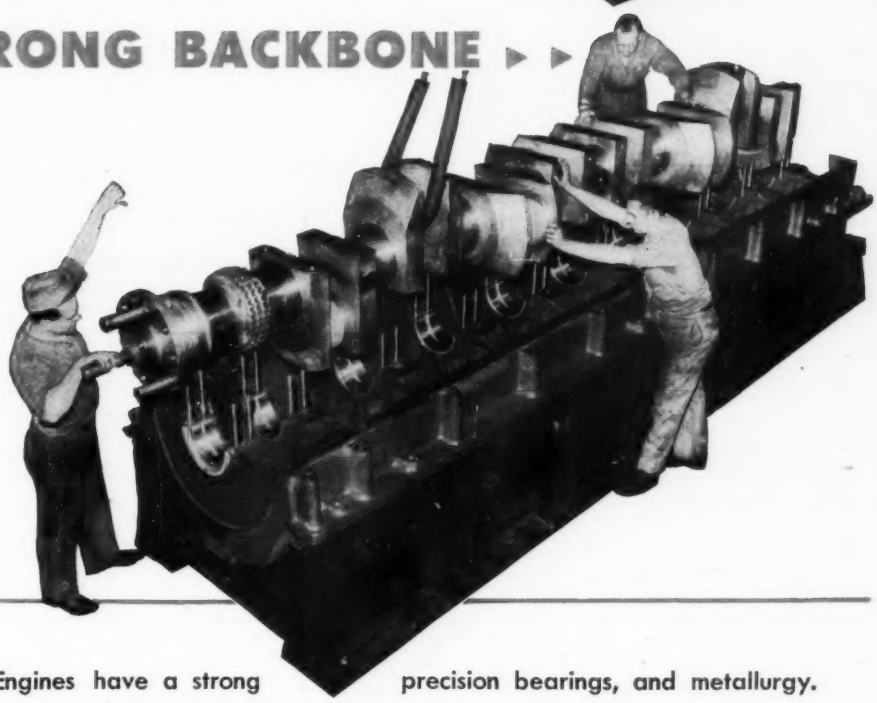
INTERNATIONAL HARVESTER

INTERNATIONAL POWER

CRAWLER AND WHEEL TRACTORS · DIESEL ENGINES · POWER UNITS

EVERY SUPERIOR DIESEL ENGINE HAS A STRONG BACKBONE ▸▸





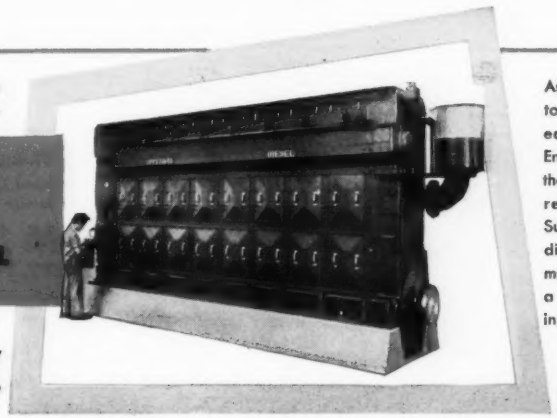
SUPERIOR Diesel Engines have a strong backbone . . . big crankshafts; sturdy bases to support them and high tensile strength alloy castings throughout. Superior's nearly 60 years of engine building experience and research have resulted in a strong, tough engine with plenty of stamina. Ways and means are constantly sought to take advantage of the latest developments in lubrication, efficient fuel consumption, precision bearings, and metallurgy.

Proof of the dependability and economy of Superior Diesel Engines lies in the constantly increasing demand for them. A demand so great, that $1,500,000 is being spent on plant expansion to take care of present and future needs. One of our sales representatives will be glad to show you how a Superior Diesel Engine will fit into your profit-building plans.

For complete details of Superior Stationary Diesels, write today for your free copy of Bulletin 4705.

Superior DIESEL

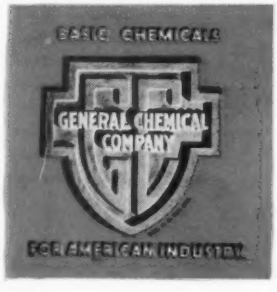
SUPERIOR ENGINES DIVISION OF
THE NATIONAL SUPPLY COMPANY
Plant and General Sales Office: Springfield, Ohio



As a result of the satisfactory performance provided by a Superior Diesel Engine installed in 1937, the city of Sandersville, Ga., recently added another Superior to provide additional power for their municipal light plant. It's a model 80-S-8 developing 1440 HP at 360 rpm.

CHEMICAL USERS' GUIDE To General Chemical Company Products for Treatment of Water, Sewage, and Industrial Wastes

PRODUCT	AVAILABLE FORMS	COMMERCIAL STRENGTH (MIN.)	SHIPPING CONTAINERS	APPLICATIONS
Aluminum Sulfate $Al_2(SO_4)_3 \cdot 14H_2O$ approx. *(Filter Alum)*	Commercial & Iron Free: Lump • Ground Powdered	17.25% Al_2O_3	Bags Barrels • Drums Bulk Carloads	Coagulant for water and sewage. Dewatering conditioner for sewage sludge. 1% Sol. pH 3.4.
Aqua Ammonia NH_4OH plus Water *(Ammonia Water)*	Colorless Liquid	26° Be. (29.4% NH_3)	Steel Drums Carboys	Used with chlorine to form chloramines for water disinfection.
Ammonium Aluminum Sulfate $Al_2(SO_4)_3 \cdot (NH_4)_2SO_4 \cdot 24H_2O$ *(Ammonia Alum) (Crystal Alum)*	Lump Nut Granular Powdered	11.2% Al_2O_3	Bags Fibre Drums	Coagulant for water. Advantageous for pressure filters. Supplies ammonia for chloramine formation. 1% Sol. pH 3.5.
Sodium Bisulfite, Anhydrous $Na_2S_2O_5$ *(ABS) (Sodium Metabisulfite)*	Powdered	97.5% $Na_2S_2O_5$ (Equiv. 65.5% SO_2)	Fibre Drums	Antichlor. Remove iron and manganese deposits from filter sand. 1% Sol. pH 4.6.
Sodium Silicate $Na_2O \cdot X(SiO_2)$ plus H_2O *(Water Glass) (Silicate of Soda)*	Viscous Liquid	38° to 52° Be. Various Ratios of Na_2O:SiO_2	Drums Tank Cars Tank Trucks	1. Aid in floc formation. 2. Prevent red water corrosion in distribution lines. 1% Sol. pH 12.7
Sodium Thiosulfate $Na_2S_2O_3 \cdot 5H_2O$ *(Hypo) (Sodium Hyposulfite)*	Crystals: Prismatic Rice Selected Universal Granular	99.75% $Na_2S_2O_3 \cdot 5H_2O$	Bags Barrels Fibre Drums	Antichlor. Water solution is neutral.
Sulfuric Acid H_2SO_4 plus H_2O *(Oil of Vitriol)*	Corrosive, oily liquid Various strengths	66° Be. (93.19% H_2SO_4)	Bottles Carboys Drums Tank Trucks Tank Cars	1. Reduce pH and alkalinity. 2. Regenerate carbaceous zeolites and ion exchangers. 3. Activate Baylis Silicate.
Potassium Aluminum Sulfate $Al_2(SO_4)_3 \cdot K_2SO_4 \cdot 24H_2O$ *(Potash Alum)*	Lump Nut Granular Powdered	10.7% Al_2O_3	Bags Fibre Drums	Coagulant for water. Slow, even rate of solubility desirable for solution pot feeders. 1% Sol. pH 3.52.
Sodium Sulfite, Anhydrous Na_2SO_3 *("Sulfite")*	Granular Powdered	98.5% Na_2SO_3	Bags Fibre Drums	Antichlor, oxygen remover. Weak solutions absorb oxygen readily. 1% Sol. pH 9.8.
Sodium Sulfate, Crystal $Na_2SO_4 \cdot 10H_2O$ *(Glauber's Salt)*	Crystal & Needle Crystal	96% $Na_2SO_4 \cdot 10H_2O$	Barrels Bags Drums	Neutral Solution. Boiler water treatment (maintenance of sulfate-carbonate ratio).
Sodium Sulfate, Anhydrous Na_2SO_4	Powdered	99.5% Na_2SO_4	Bags Barrels	Neutral Solution. Boiler water treatment (sulfate-carbonate ratio)
Trisodium Phosphate $Na_3PO_4 \cdot 12H_2O$ *(TSP)*	Crystal	98.5—103% $Na_3PO_4 \cdot 12H_2O$ (Equiv. 19% P_2O_5)	Bags Barrels Fibre Drums	Boiler water treatment. Cleaning compound. 1% Sol. pH 11.8-12.0.
Disodium Phosphate, Crystal $Na_2HPO_4 \cdot 12H_2O$	Crystal	98% $Na_2HPO_4 \cdot 12H_2O$ (Equiv. 19.5% P_2O_5)	Bags Barrels Fibre Drums	Boiler water. (Calcium and magnesium precipitation.) 1% Sol. pH 8.4.
Disodium Phosphate, Anhydrous Na_2HPO_4	Powdered Flake	96% Na_2HPO_4 (Equiv. 48% P_2O_5)	Same	Same as Crystal, but stronger product.
Sodium Fluoride NaF *(Fluoride)*	Powdered (white or blue colored: Nile Blue) Light or dense	90% and 95% NaF	Bags Barrels Fibre Drums	Fluorination of water supplies. (For information, consult with local health officers.)



FOR THE LABORATORY: Baker & Adamson Laboratory Reagents

For full information on these and other General Chemical Company products, write or phone the nearest Sales and Technical Service Office below.

GENERAL CHEMICAL COMPANY

40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport Buffalo • Charlotte • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City • Los Angeles Minneapolis • New York • Philadelphia • Pittsburgh • Providence • San Francisco • Seattle • St. Louis Wenatchee and Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

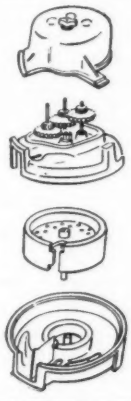
Why...

THE MOST METER COSTS THE LEAST

Even when Empire meters sold for a high premium over ordinary meters, they were still the least expensive you could buy. And at today's comparative prices they are the biggest meter bargain ever offered.

When you figure the cost of removing, repairing and replacing a stopped meter . . . when you figure the revenue loss on meters that register less and less as time goes on . . . then it becomes apparent that overall cost should be your chief consideration when buying meters.

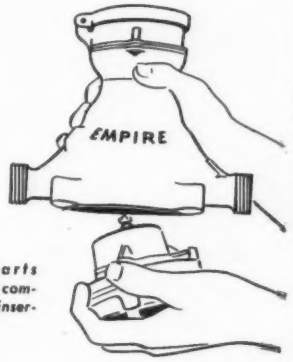
Empire meters, with their balanced oscillating piston principle, cost least in the long run. And this statement is backed by hundreds of water works men who have had ten, twenty, even thirty years of Empire metering experience.



Simple construction, interchangeability, few working parts.

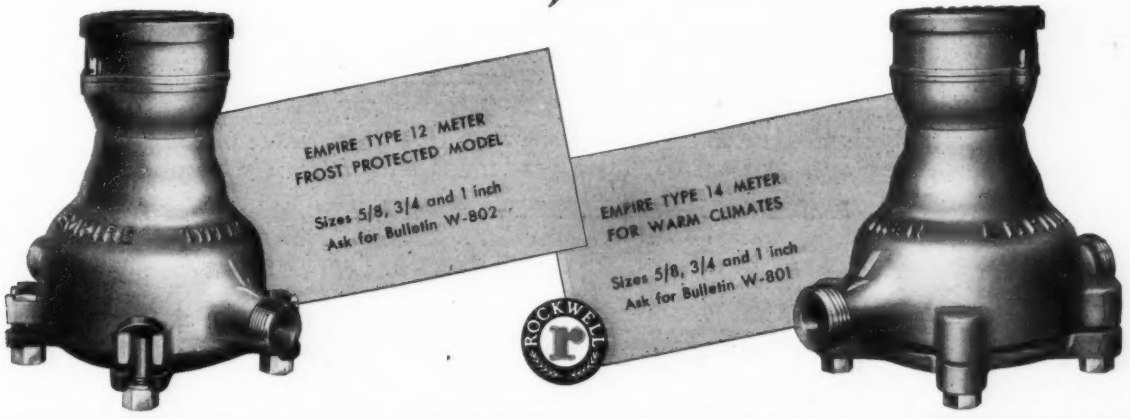
COSTS LESS TO REPAIR, TOO

Here is the simple arrangement of component parts of the working mechanism in Empire Type 12 and Type 14 meters. Speedy dismantling and assembly; fewer parts, exactingly interchangeable parts, all combine to make short work of meter shop operations. There are only three interior castings. They assemble without the use of screws. Fitting is quick, positive. The assembled measuring unit can be pre-tested for its free running qualities prior to being bolted in the meter case.



Working parts assemble as a complete unit for insertion in case.

EMPIRE *Oscillating Piston* METERS



PITTSBURGH EQUITABLE METER DIVISION

Rockwell Manufacturing Company....Pittsburgh 8, Pennsylvania

Atlanta, Boston, Chicago, Houston, Kansas City, Los Angeles, New York
Pittsburgh, San Francisco, Seattle, Tulsa

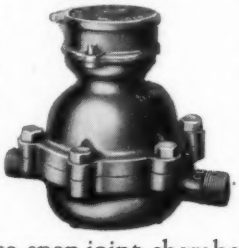
Badgers meet ALL REQUIREMENTS

There is a BADGER METER to meet your every requirement from a 5/8" household service to a 12" industrial installation.

MODEL A-IOT

The model A-IOT is of a frost proof design. Breakable bottom plates are attached to the main housing by heavy stud bolts. There is no possibility of corrosion or dirt causing the bolts to stick.

MODEL SC-IOT

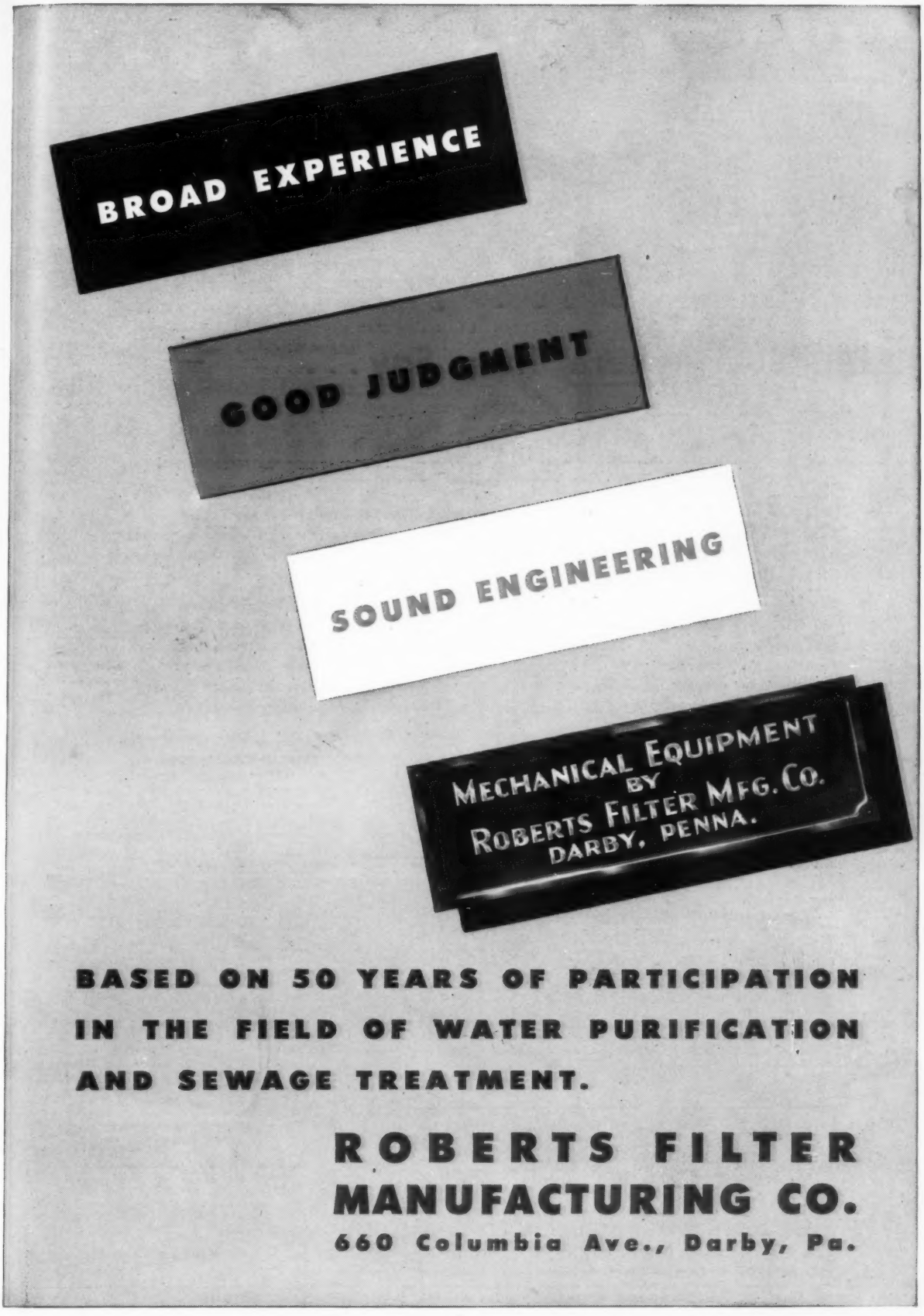


The model SC-IOT is a split case meter for use in warmer climates, where there is no danger of freezing. Working parts can be removed from the housing without disconnecting meter from the line.

Both models have two-piece snap joint chambers, three piece discs and oil enclosed gear trains. Open gear trains are available without extra cost.

BADGER METER MFG. CO. · Milwaukee 10, Wisconsin, U. S. A.

Branch Offices: New York City - Chicago, Illinois - Waco, Texas - Portland, Ore. - Salt Lake City, Utah - Seattle, Wash. - Cincinnati, Ohio - Philadelphia, Pa. - Denver, Colo. - Worcester, Mass. - Kansas City, Mo. - Tampa, Fla. - Savannah, Ga. - Los Angeles, California



BASED ON 50 YEARS OF PARTICIPATION IN THE FIELD OF WATER PURIFICATION AND SEWAGE TREATMENT.

ROBERTS FILTER MANUFACTURING CO.

660 Columbia Ave., Darby, Pa.

Some Places They Say

"It's a RIPE ONE!"

But Everywhere They Say . . .

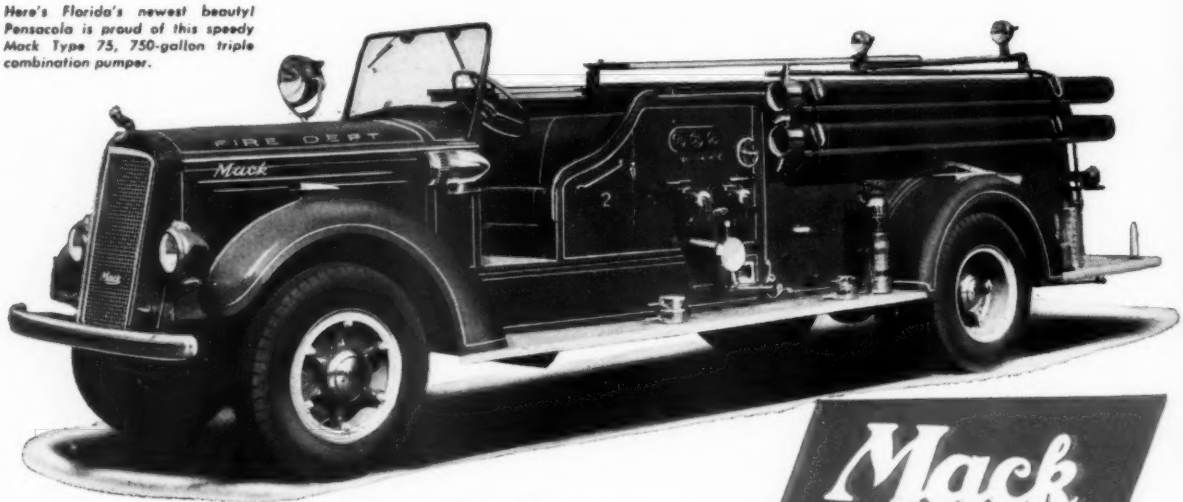
"Macks Stand Up Better"

● Speaking of fires, in some parts of the country you'll hear firefighters say "It's a ripe one!" when stretching into a location that's heavily charged with smoke. Speaking of apparatus, in departments all over the country you'll hear experienced firemen say "Macks *stand up* better!"

There's small wonder that dependable Macks enjoy this reputation. For 37 years Mack fire apparatus have been precision-built in Mack's own factories to advanced and exacting engineering standards. Beneath their gleaming modern appearance lie the rugged engines and running parts, the stout frames that only Mack's great facilities can provide. And Macks stand up better not only through the strain of hard firefighting conditions, but also under the wear and tear of responding to alarms.

When ordering your new apparatus, *Modernize with Macks!* In over 1,000 departments, Macks of all sizes and specifications are showing the way to greater performance and dependability.

Here's Florida's newest beauty! Pensacola is proud of this speedy Mack Type 75, 750-gallon triple combination pumper.



FIRE APPARATUS DIVISION
MACK MANUFACTURING CORPORATION
Long Island City 1, New York, N. Y.

Factory branches in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Ltd.

Mack FIRE APPARATUS

5177

TRIPLE COMBINATION PUMPERS—500 TO 1,250 GALLONS . . . SQUAD WAGONS . . . CITY SERVICE AND QUADRUPLE COMBINATION LADDER TRUCKS

Save...

Time, Money and Labor in making pipe joints

« « « The only field equipment necessary to make a Universal Cast Iron Pipe Bolted Joint is a Ratchet Wrench.

by using

UNIVERSAL
CAST IRON PIPE

(PIPE and JOINT are ONE)

Outstanding Advantages:

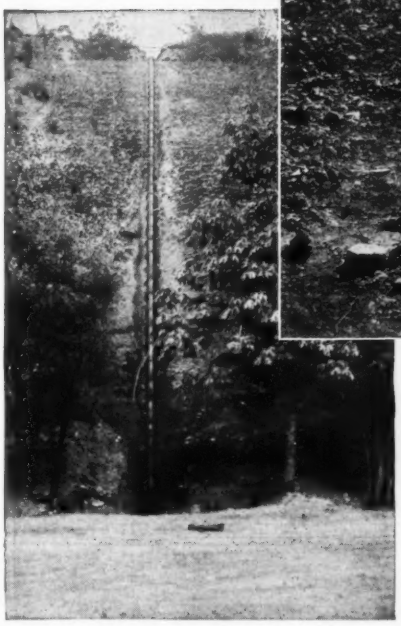
1. *No calking or pouring of lead or lead substitutes. No gaskets used.*
2. No bell holes to dig. Can be laid in a narrow trench. Cost of wide trenching is eliminated.
3. *Can be laid with SPEED. Easier and cheaper to install because only two bolts need to be inserted in the lugs, tightened with a ratchet wrench (the only tool needed), and the completed joint is made in a few minutes. Experienced workmen are not needed.*
4. Nothing to deteriorate; nothing to work loose; no leakage; no maintenance cost.
5. Flexibility: Universal pipe is very flexible. It withstands expansion, contraction, unequal settlement, vibration and shock, and electrolysis. Many curves are laid with straight lengths and do not need special fittings.
6. *Universal pipe can be laid on rocky soil, under water and in sub-zero weather.*

Specify UNIVERSAL PIPE for water mains and sewers

Furnished in hot tar dipped, cement lined, and enameline lining.

Quick service to customers: By rail, truck or water from our foundries and warehouses located from coast to coast.

THE CENTRAL FOUNDRY CO.
386 FOURTH AVENUE, NEW YORK 16



Above *All straight lengths of Universal pipe in this curve.*

At left *16" pipe laid on a 45-degree slope. Note deflection at top to level ground without fittings.*

↓ USE THE COUPON ↓

DEPT. C

THE CENTRAL FOUNDRY COMPANY
386 Fourth Avenue, New York 16, N. Y.

I am interested in SAVING LABOR, TIME, MONEY and EQUIPMENT in pipe-laying. Send me the UNIVERSAL catalog.

Name .....

Position .....

Address .....

.....

Be Sure to Stop in and See Us at the AWWA Convention in San Francisco July 21-25. Our Booth Numbers Are 20 and 21

for SURFACE BINDING of UNPAVED ROADS

SOLVAY

TRADE MARK REG. U. S. PAT. OFF.

CALCIUM CHLORIDE

TRADE MARK

- Ends Dust
- Reduces Blading
- Saves Surfacing Materials
- Provides Smoother Riding

SOLVAY SALES CORPORATION

40 Rector Street, New York 6, N. Y.

HAND

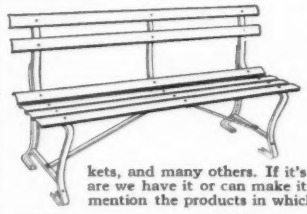
STORAGE BATTERIES

FOR MUNICIPALITIES

HAND storage batteries are heavy-duty batteries provided with heavy, hand-pasted tank-formed plates, heavy glass mats, acid and heat resisting micro-porous rubber separators, splash decks and genuine hard rubber containers. Built for use in Police Radio cars, Sanitation trucks, snow plows, sweepers, emergency trucks, ambulances, and fire apparatus.

The Hand Laboratory, Nyack, N. Y.

Stewart Iron and Wire Products for All Types of Public Property



They comprise: Chain Link Wire and Iron Picket Fences and Entrance Gates; Wire Mesh Partitions; Steel Folding and Sliding Gates; Wire and Iron Window Guards; Plain and Ornamental Iron Railings; Bracket and Pier Lanterns; All Steel Settees (illustrated); Flagpoles; Bronze Tablets; Wire Trash Baskets, and many others. If it's made of iron or wire, chances are we have it or can make it. When writing for information mention the products in which you are especially interested.

Stewart IRON and WIRE FENCES

THE STEWART Iron Works Co., Inc.

1421 Stewart Block

CINCINNATI 1, OHIO

LEADITE

FOR JOINTING CAST-IRON WATER MAINS

Melted and Poured *No Large Bell-holes to Dig*

Saves at Least 75%

Leadite is shipped in powder form, packed in sacks of 100 lbs. net each. Leadite tested and used for over 50 years • Leadite joints improve with age.

Be sure it is Leadite and accept no imitations

THE LEADITE COMPANY

Girard Trust Co. Bldg., Philadelphia 2, Pa.

No Caulking

PARK-N-LOT*

THE NEW 10-HOUR MODEL
PARK-O-METER

. . . will pay for *Municipally* owned off-street parking lots and solve your whole parking problem!

PARK-N-LOT* meters are *positively doing the job* in cities now using them. They will do the same for you. Ask us to put you in touch with city officials who will give you their experience.

PROFITABLE Park-N-Lot* Meters pay for themselves quickly . . . pay for off-street parking facilities . . . then continue to bring in revenue year after year.

DURABLE These automatic meters employ the same time-proved mechanism that has made Park-O-Meter the outstanding parking meter throughout the nation. They are foolproof, simple to operate, require minimum attention and servicing.

UNIVERSAL Park-N-Lot* Meters can be set and reset to meet every parking requirement in both busy and fringe areas. Here is a typical operating plan:

FRINGE AREA	BUSY AREA
2 hours, 1 nickel	1 hour, 1 nickel
4 hours, 2 nickels	2 hours, 2 nickels
6 hours, 3 nickels	3 hours, 3 nickels
8 hours, 4 nickels	So on through 10 hours
10 hours, 5 nickels	5 hours, 1 quarter
10 hours, 1 quarter	10 hours, 2 quarters

* Registered Trade Mark U. S. Pat. Off.

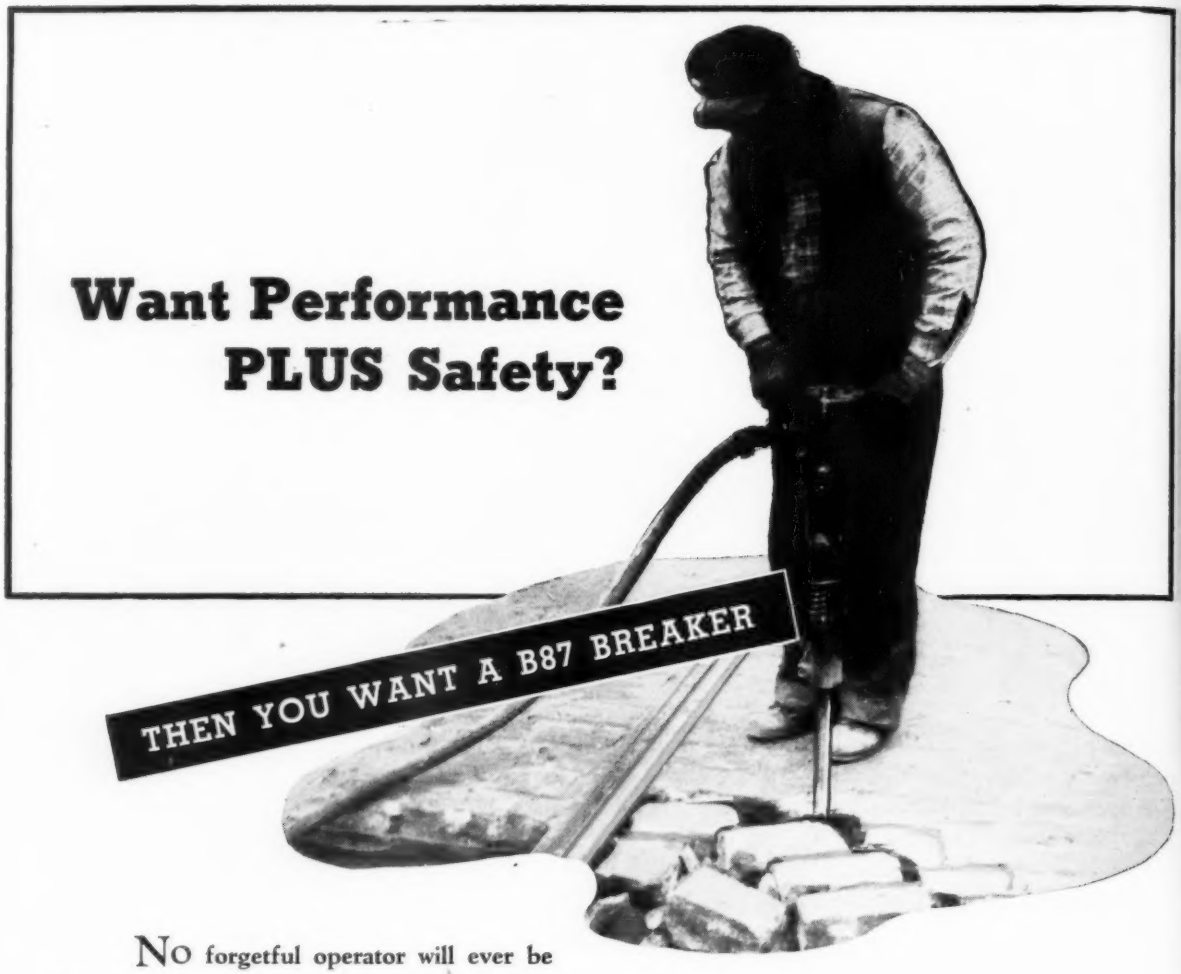
DELIVERIES NOW BEING MADE

Magee-Hale **PARK-O-METER COMPANY**

COMMERCE EXCHANGE BUILDING • OKLAHOMA CITY 2, OKLAHOMA

MACNICK DIVISION, *Manufacturers*, TULSA, OKLAHOMA

Want Performance PLUS Safety?



NO forgetful operator will ever be injured in moving a Gardner-Denver B87 Paving Breaker from place to place. This breaker is equipped with a new safety latch which enables it to be moved without shutting off the air. Working exactly like the "safety" on a gun, this latch prevents accidental opening of the throttle.

This highly efficient paving breaker, the B87, is easily convertible to a sheeting driver by removing the standard chuck and substituting jaw type sheeting driver head. Here are other features of the B87 that your men will like:

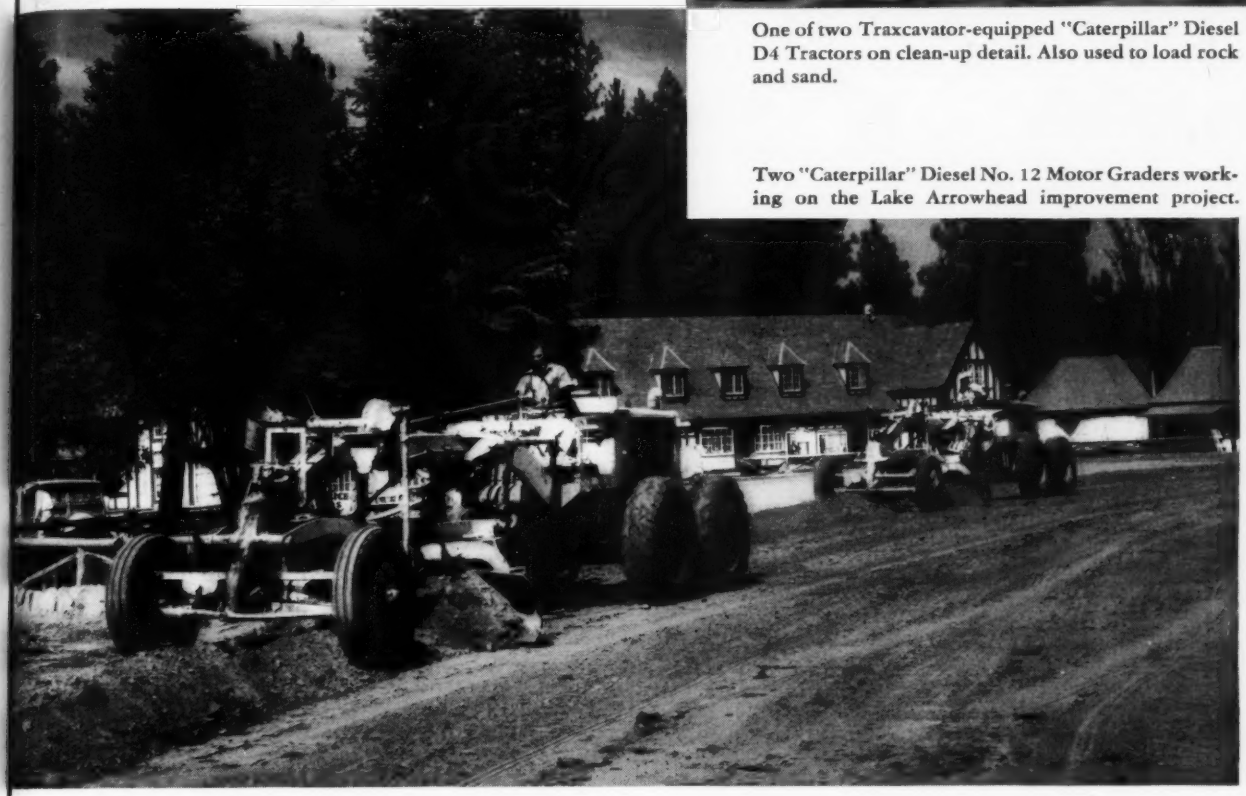
- ✳ *Easier to handle—a shorter breaker that offers more convenience either with standard length chisels and gads or with longer points.*
- ✳ *Oil and air economy — no joints on the B87 Breaker are under air pressure — there's no wasteful leakage of air or oil.*
- ✳ *Cooler handles — because air inlet is at side of cylinder, not through backhead.*
- ✳ *Positive built-in lubrication — integral reservoir provides for 5 hours normal operation.*
- ✳ *Better tool retainer — no nuts to work loose on the B87 — the extra heavy forged retainer pivots on a substantial pin held positively in place.*

GARDNER-DENVER
SINCE 1859

For complete information, write
Gardner-Denver Company, Quincy, Illinois

Picture-village gets a "facial"

One of two Traxcavator-equipped "Caterpillar" Diesel D4 Tractors on clean-up detail. Also used to load rock and sand.



Two "Caterpillar" Diesel No. 12 Motor Graders working on the Lake Arrowhead improvement project.

It's often amazing what a good cleaning-and-touch-up can do for a community. It attracts new residents, stimulates business, increases property values. Famous Lake Arrowhead is going at it to the tune of several million dollars.

"Caterpillar" Diesel equipment, of course, is conspicuous—regrading and resurfacing roads, enlarging parking areas, improving housing sites, beautifying surroundings—making life more livable. Because of their versatility, big work-capacity, ruggedness, long life, and extraordinary operating economy, "Caterpillar" Diesel Tractors and Motor Graders are often the key that opens the way to street, housing, airport, drainage, water-system and other improvements which otherwise might remain unborn for years to come. They're a real boon to American municipalities.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR DIESEL

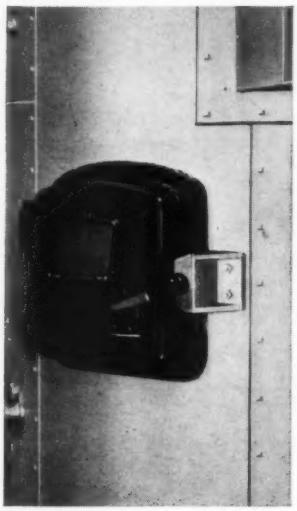
REG. U.S. PAT. OFF.

ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

XUM

Don't!

OPEN THE DOOR, RICHARD!*



No, Richard doesn't have to open the door if he's the operator of a modern Nichols MONOHEARTH Mechanically Stoked Refuse Incinerator.

Opening doors leads to a lot of back-breaking LABOR on old style manually stoked incinerators.

Let a fractional H. P. motor do the work. Make your new† refuse incinerator a MONOHEARTH, the Modern, Mechanically Stoked incinerator.

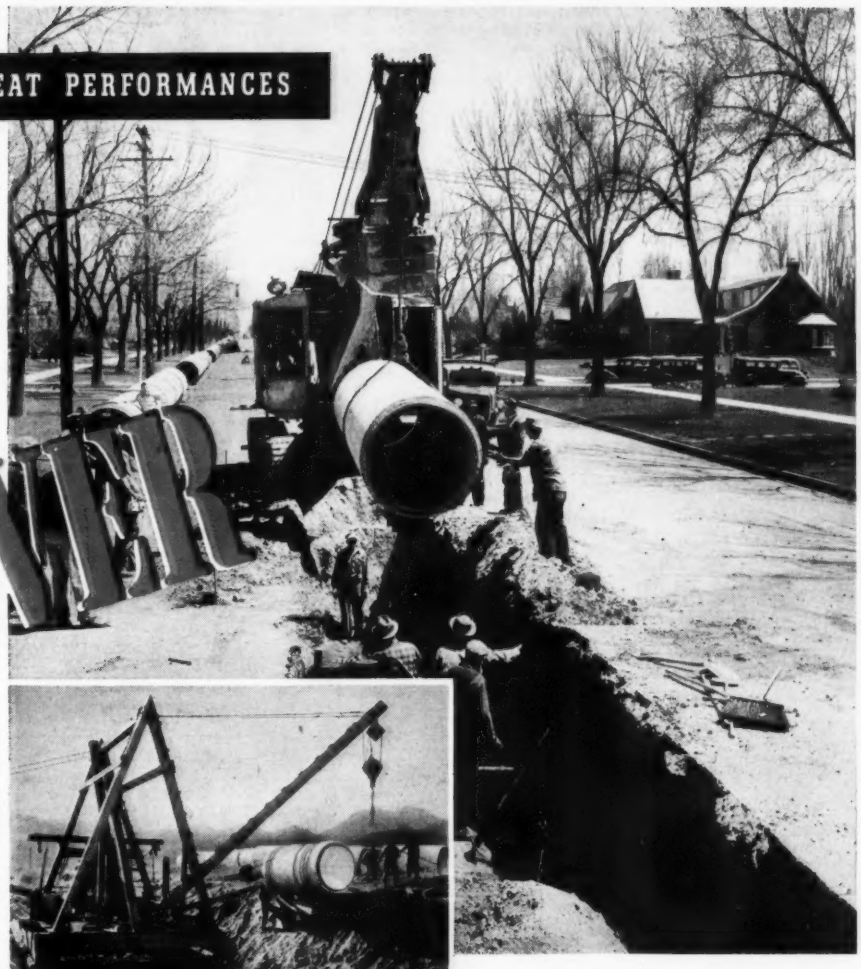
†Or modernize your existing incinerator by installing a Nichols Monohearth cone and stoking arms.

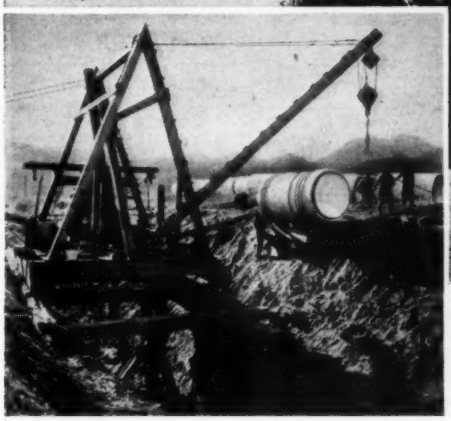
*Courtesy of Duchess Music Corporation, copyright 1947.

NICHOLS ENGINEERING & RESEARCH CORP.
60 WALL TOWER
NEW YORK 5 · NEW YORK
UNIVERSITY TOWER BUILDING, MONTREAL, CAN.

LOCK JOINT REPEAT PERFORMANCES

DENVER





13 JOBS SINCE 1920

1940—Above: Installing 48" pipe through center of street in residential area.

1921—Left: Installing pipe with old type wooden derrick astride ditch.

To meet the enormous demands of increasing population and expanding industry, Denver has steadily extended its water supply system. Since 1920 Lock Joint Pipe Company has been awarded 13 major water works contracts totalling approximately 90 miles of Reinforced Concrete Pressure Pipe. Such repeat orders, not only for Denver but for many other key cities, are convincing evidence of the incomparable quality of Lock Joint Reinforced Concrete Pressure Pipe.

The life expectancy of Lock Joint Reinforced Concrete Pressure Pipe has been rated at better than 100 years. During this life span Lock Joint Pipe will retain its characteristic high qualities: immense structural strength, permanent high carrying capacity, low maintenance cost and unfailing service.

SCOPE OF SERVICES—*Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains in a wide range of diameters as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.*

For future projects, large or small, specify Lock Joint Pipe.

A Hazen-Williams Hydraulic Slide Rule will gladly be sent upon request with our compliments.

★

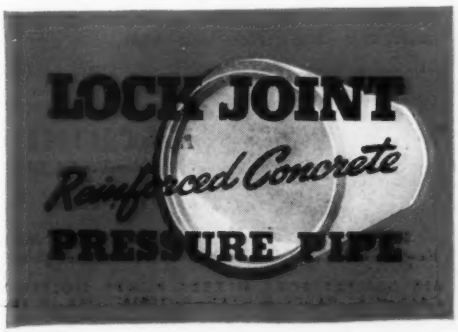
LOCK JOINT PIPE COMPANY

Established 1905

P. O. Box 269, East Orange, N. J.

Pressure Pipe Plant: Wharton, N. J. • Sewer Plant: Kenilworth, N. J.

BRANCH OFFICES: Denver, Colo. • Chicago, Ill. Kansas City, Mo. • Rock Island, Ill. • Joplin, Mo. Valley Park, Mo. • Cleveland, Ohio • Hartford, Conn. Navarre, Ohio



AIR PLUS JAEGER COMPRESSOR

P-u-r-r-s like a kitten
KICKS like a mule

You've never seen an air compressor as quiet, cool and easy-running as the Jaeger "AIR PLUS." Precision built and balanced, like the fine engines with which they're powered,* these modern compressor units function at far slower piston speed and lower temperatures, produce more air with every pound of fuel and will out-last their original power plants 3-to-1. For LOWEST COST AIR (based on reduced fuel consumption, minimum upkeep and far longer compressor life), equip with "AIR PLUS" in any size from 60 to 500 cu. ft.

*(*Continental, Caterpillar and International engines standard.)*

SOLD, RENTED, SERVICED IN 120 CITIES

Ask your Jaeger distributor to show you these and many other "AIR PLUS" features: 75% to 100% bigger, "ultra-lapped" valves — 20% to 30% slower, long-life piston speed (only 800 f.p.m.) — 100% positive force-feed lubrication—100% efficient intercooling—30% to 50% larger air receivers — bigger tool boxes, lifetime clutches, sectional radiators and intercoolers, grouped controls, electric starters are standard. Timken-bearing trailer or truck or tractor mounting to meet your needs.

Ask for Catalog JC-5, the up-to-date-buyer's guide.

THE JAEGER MACHINE CO.
Main Office and Factory — Columbus 16, Ohio

REGIONAL OFFICES

8 E. 48th St. New York 17, N. Y. | 226 N. LaSalle St. Chicago 1, Ill. | 235-38 Martin Bldg. Birmingham 1, Ala.

AIR COMPRESSORS, MIXERS, PUMPS, HOISTS, PAVING MACHINERY, TRUCK MIXERS—DISTRIBUTORS IN 120 CITIES

You, too, will win popular acclaim!

(Like Mayor Botts)

Troubles haunted Mayor Botts. Like most public servants, he couldn't seem to please everybody. But in nearby Centerville, he heard the people were very pleased about something. So Botts approached his rival, the mayor of Centerville. . .

BOTTS: What have you been doing to win this unusual public favor?

RIVAL: (proudly) We brought soft water to Centerville —it's wonderful!

BOTTS: (amazed) What, contented constituents from soft water? I've got to see that!

RIVAL: (taking Botts' arm) Come on—I'll prove it.

MRS. S: (over the weekly wash) Soft water? See for yourself—look at my whiter, cleaner clothes . . . and it saves soap, lots of soap!

BOTTS: (to himself) The women must love it!

MR. S: (from bathtub) Ah, yes . . . bathing and shaving are almost fun with soft water. And it saves plumbing repairs and fuel costs.

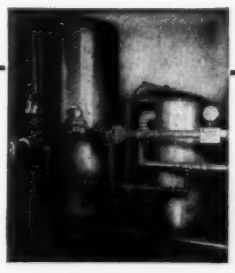
BOTTS: (to rival) And the men like it too.

GRANDMA S: (washing dishes) See how these dishes sparkle. That's because there are no greasy soap curds.

BOTTS: (shouting) Sensational! ! !

At last, Mayor Botts learned to please everybody—a Refinite municipal soft water plant, of course! What happened? Well, the Council caught his enthusiasm and voted soft water unanimously. Everyone is pleased with Botts.

Write for information on soft water for your town.



The Refinite Corporation

REFINITE BUILDING • OMAHA NEBRASKA

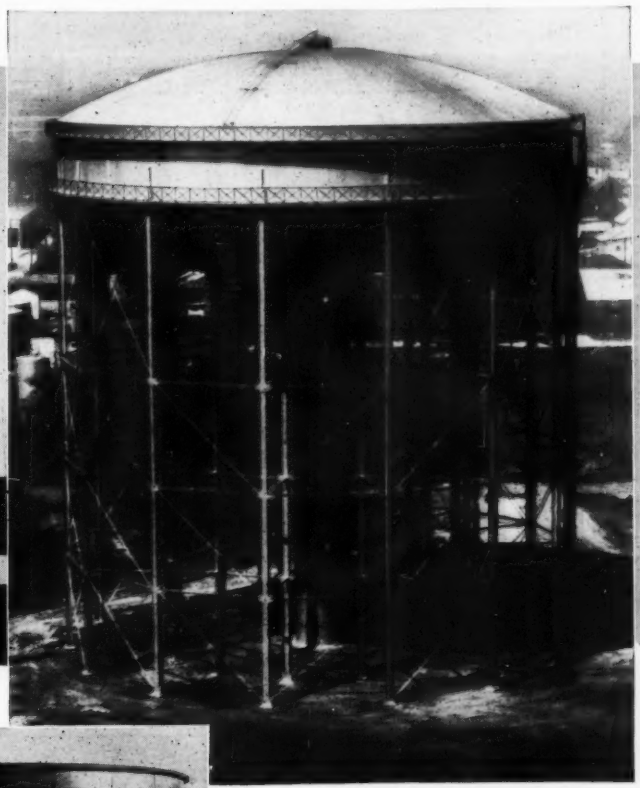
Long-Term Assets to the Modern Waterworks System . . . . .

for EFFICIENT SERVICE · LOWER MAINTENANCE · GREATER DURABILITY

Pittsburgh Des Moines

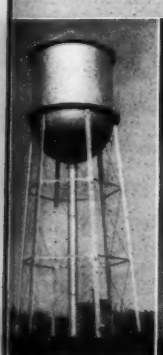
ELEVATED STEEL TANKS

and STEEL RESERVOIRS



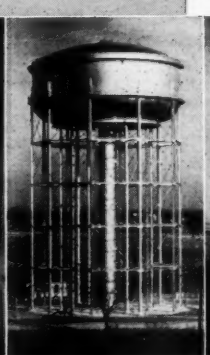
1,500,000 gal. toroidal bottom tank; structural tower. Diameter 103'4", head range 25'; height to bottom 85'. Fort Dodge, Iowa.

Two 3,000,000 gal. steel reservoirs, diameter 144', height 25'. Berryville, Va.

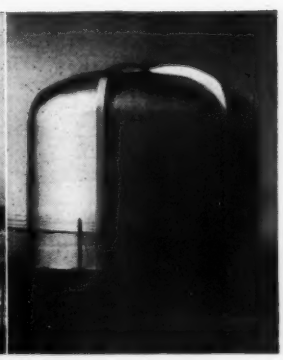


000 gal. cone of, hemispherical bottom tank, 118' to p. Stillwater, Okla.

500,000 gal. double ellipsoidal tank, on 100' tower. Mission, Texas.



1,000,000 gal. toroidal bottom tank; diameter 76'9", height 127', head range 30'. Keokuk, Iowa.



2,200,000 gal. steel reservoir; ellipsoidal roof; ornamental pilasters. Diameter 80', height 51'. Midland, Tex.

The choice of elevated steel tank or steel reservoir depends largely upon local land elevations. The choice of PITTSBURGH-DES MOINES as designers, fabricators and erectors of your required units is equally logical: you benefit by a half-century of experience in this type of construction, and a guarantee of complete satisfaction with each installation. *May we consult on your water storage needs?*

A NEW PITTSBURGH · DES MOINES STEEL FABRICATING PLANT at SANTA CLARA, CALIFORNIA

PITTSBURGH • DES MOINES STEEL CO.

PITTSBURGH, PA., 3412 NEVILLE ISLAND • DES MOINES, IOWA, 913 TUTTLE STREET

SANTA CLARA, CAL., 619 ALVISO ROAD

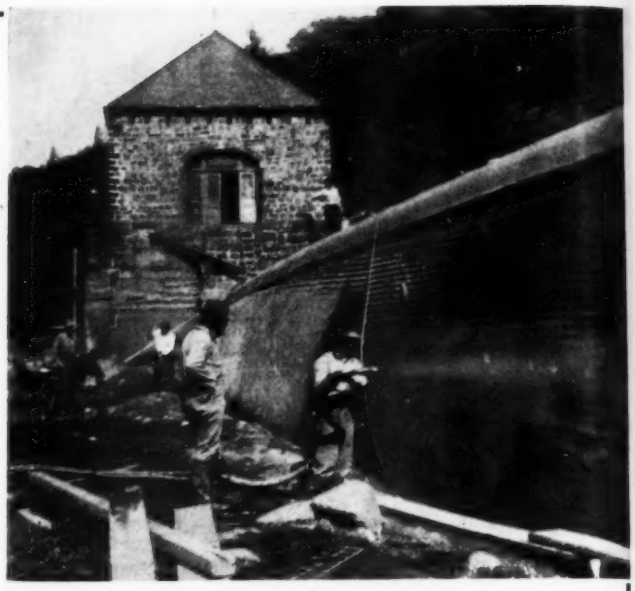
NEW YORK, ROOM 915, 270 BROADWAY • CHICAGO, 1216 FIRST NATIONAL BANK BUILDING

DALLAS, 1217 PRAETORIAN BUILDING • SEATTLE, 520 FIRST AVENUE, SOUTH

"GUNITE"
repairs
Masonry Dam

This stone masonry dam, property of an eastern water company, was badly in need of repair. A three-inch facing of reinforced "GUNITE" was installed and resulted in a completely waterproof structure. The finished job has stopped the extensive leakage and the new surface is resistant to further disintegration.

Maintenance costs have been sharply reduced and years of service have been added to the life of this dam. Our engineers will gladly make inspections and give estimates on the cost of repair to structures under your supervision. No obligation, of course.



Is your present problem a reservoir, tanks and filters, or coagulating and settling basins? Write for an interesting folder showing how "GUNITE" can solve your water supply repair problems.

6 AVENUE B
NEWARK, N. J.

PRESSURE CONCRETE COMPANY
ENGINEERS AND CONSTRUCTORS

SOUTH COURT ST.
FLORENCE, ALABAMA

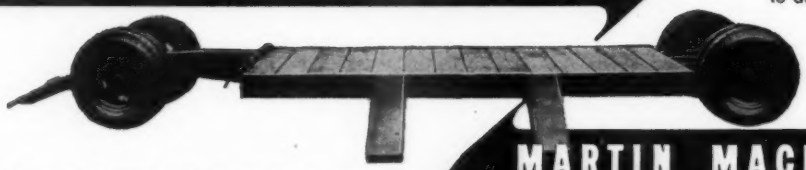
Eastern Distributors of
FISHER M-SCOPE and LEAK DETECTORS

Joseph G. Pollard Co., Inc.
PIPE LINE EQUIPMENT
141 ASHLAND PLACE, BROOKLYN 1, NEW YORK

MARTIN CARRYHAUL TRAILERS
TRADE MARK REGISTERED

MARTIN CARRYHAUL TRAILERS
"Make Hauling A Pleasure!"

Ease of loading, dependability and economical operation are three Martin CARRYHAUL Trailer characteristics which make them the leaders in the field.
Regardless of your hauling job, there's a proper size Martin CARRYHAUL Trailer to do it for you safely and economically.



Your "CATERPILLAR" Dealer is your MARTIN Dealer. See him for your trailer needs.

MARTIN MACHINE COMPANY
KEWANEE, ILLINOIS

To Purchasers of Municipal Shade Tree and Park System Equipment.

Before you buy, make certain that you obtain full information about the **UNIVERSAL ONE-MAN POWER CHAIN SAW.** This amazing piece of time and labor-saving equipment is made for one-man operation. WEIGHS ONLY 38 lbs. Powered by a 3-hp., 2-cycle engine. Available in 20" or 26" cutting sizes. It is rugged and dependable, does horizontal to vertical sawing. Thoroughly proven by thousands in use in many phases of wood operations. For particulars, write

WILLIAM A. NICHOLS

268 Carmita Avenue — Phone: RUtherford 2-9030 — **Rutherford, N. J.**

With an M-SCOPE Water Leak Detector it's easy!

Saves time, money, mess, trouble

Gives you new up-to-date records

Checks your records

Shows exactly where to dig.

—and with the

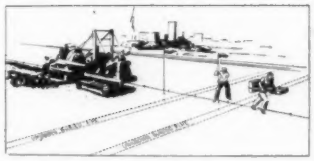
M-SCOPE

Buried Pipe and Cable Finder

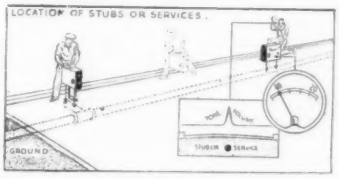
it's easy to locate a hidden pipe and trace its course:

The M-SCOPE is solving successfully the varied problems involved in the development, operation and maintenance of buried pipe and cable systems, and is in daily use on projects engaged in by

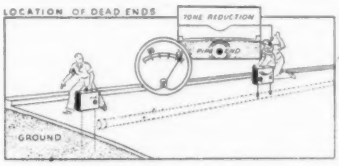
Federal Departments
Municipalities
Water Companies
Power and Light Companies
Oil and Pipe Line Companies
Industrial Companies
Airport Managers
Consulting Engineers



easy to locate a stub:



—or a dead end:



M-SCOPE quickly locates the exact position of underground pipe lines, pipe bends, dead ends, valves, cast iron bells, stubs, service connections, etc.

Free 16-Page Booklet Upon Request

FISHER RESEARCH LABORATORY, Inc.

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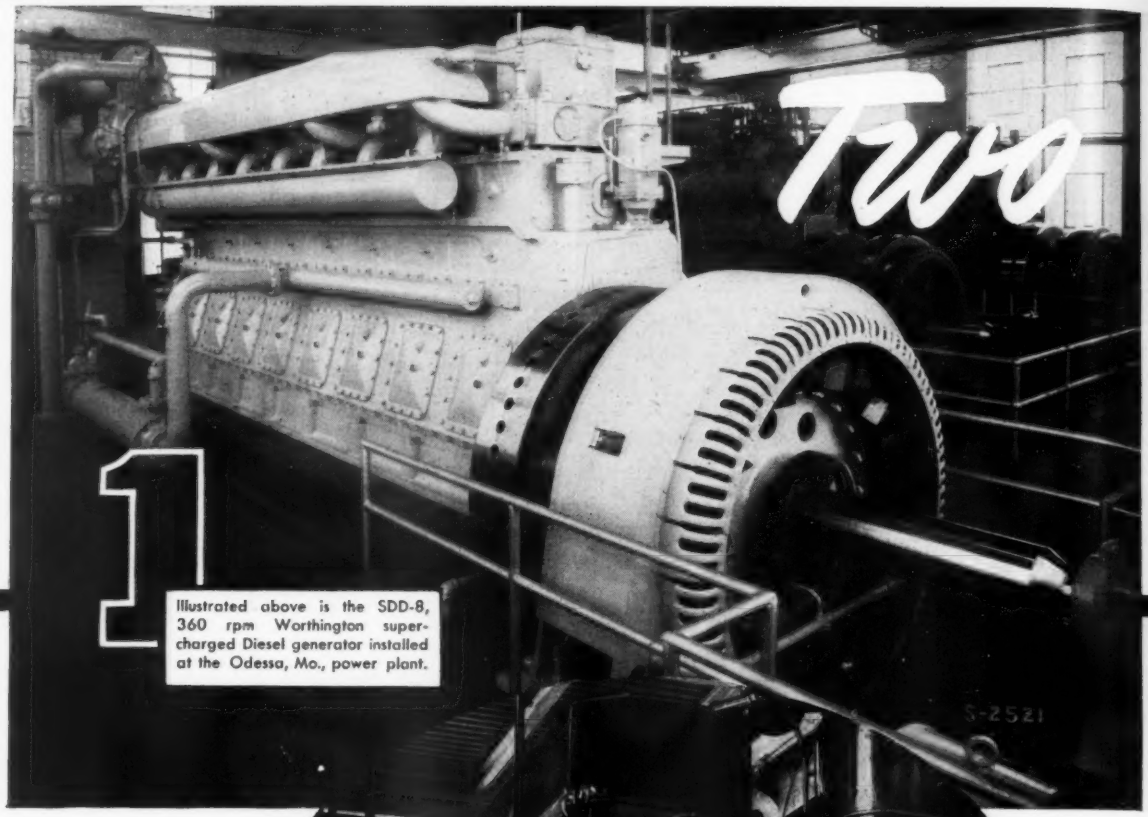
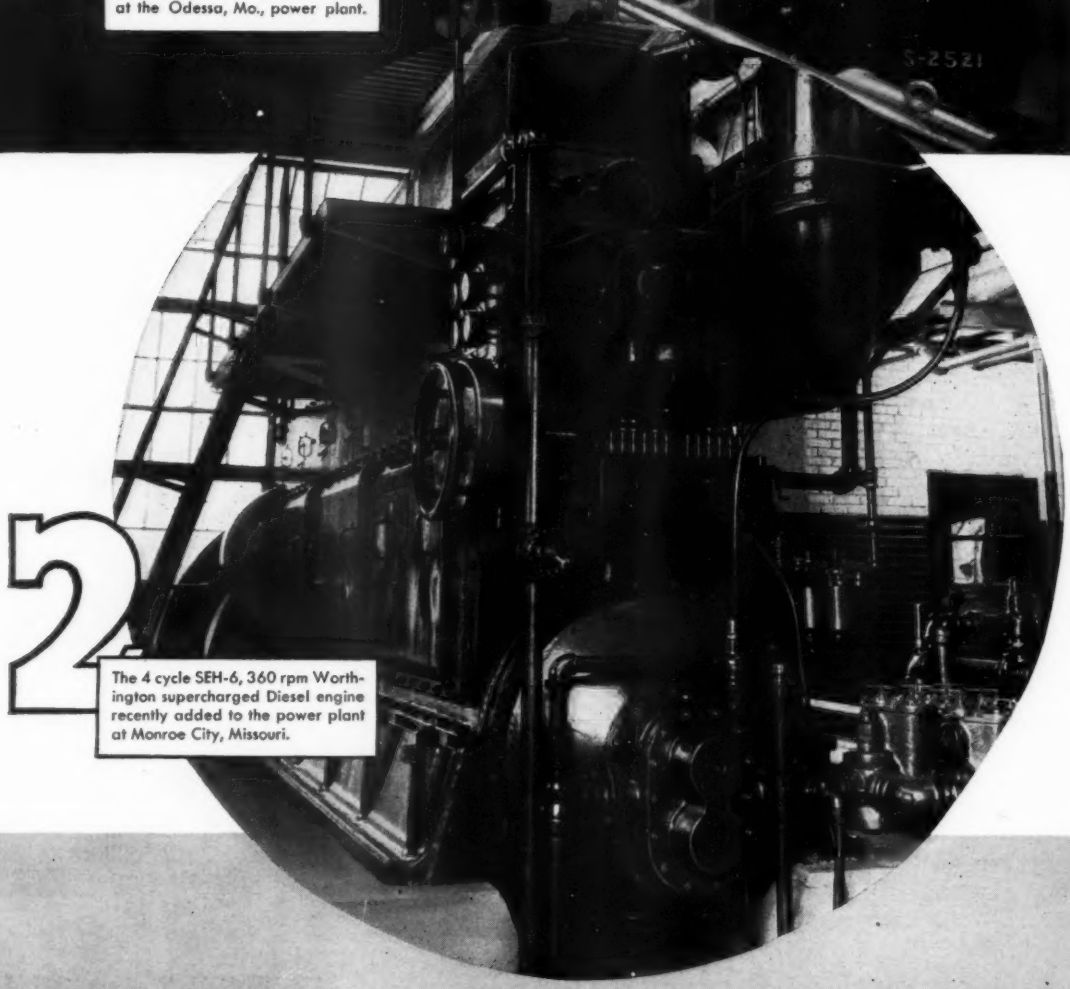


Illustrated above is the SDD-8, 360 rpm Worthington supercharged Diesel generator installed at the Odessa, Mo., power plant.



The 4 cycle SEH-6, 360 rpm Worthington supercharged Diesel engine recently added to the power plant at Monroe City, Missouri.

Power Plants

PREPARED FOR TOMORROW'S GROWTH

Operating with Economy Today

In Missouri the municipalities of Monroe City and Odessa design their generating plants for *future* power demands by installing Worthington supercharged Diesel engines, today.

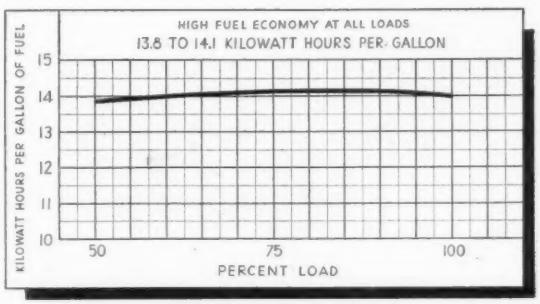
And the new Diesels . . . installed in both plants in 1946 . . . supplement other Worthington Diesels placed in Monroe City since 1935, and in Odessa since 1939.

For the investigated facts proved to these two communities that the low fuel demands of the Worthington supercharged Diesels were economically sound, even when operated at fractional capacity.

Yet, future increases in power demands are adequately provided for at the same low fuel consumptions (see chart), making the future use of these Worthington Diesels continually profitable.

So if your community seeks power that is highly economical today . . . greatly profitable in the future . . . designed for long life and easy maintenance . . . then investigate Worthington supercharged Diesel engines.

Write for more information and prove to yourself that *there's more worth in Worthington. Worthington Pump and Machinery Corporation, Engine Division, Buffalo, New York.*



This chart illustrates the Worthington Diesel's low fuel costs . . . and the very slight rise in fuel demands when changed from fractional to full power loads.

WORTHINGTON

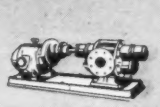
E7-6

YOUR PARTNER IN POWER PROGRESS

Diesel engines, 150 to 3,520 hp . . . gas engines, 175 to 3,290 hp . . . dual fuel Diesel engines, 225 to 3,290 hp.

WORTHINGTON-BUILT AUXILIARIES

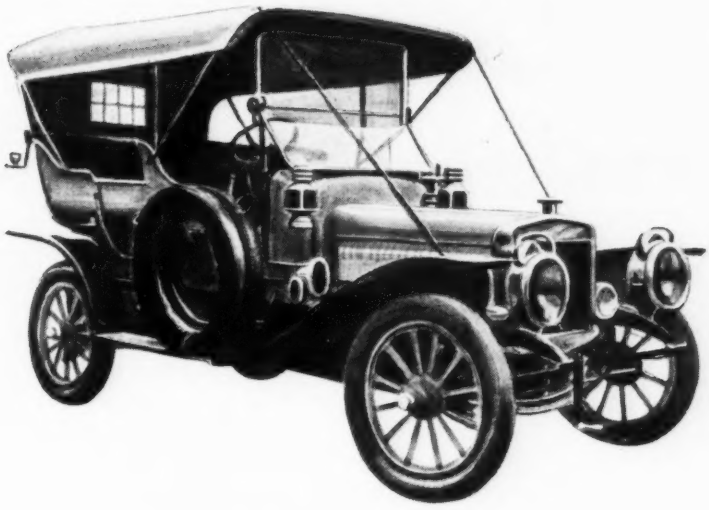
Air King Compressors



Oil Transfer Pumps

Cooling Water Circulating Pumps

Evaporative Type Engine Water Cooler



THE AUTOMOBILE WAS A RICH MAN'S TOY

THE AUTOMOBILE WAS A RICH MAN'S TOY—but today nearly everyone drives a car.

An important reason for the rapid success and wide acceptance of the automobile is that it was designed and engineered for a single purpose . . . to provide better transportation.

The same reason accounts for the rapid success and wide acceptance of Transite Pressure Pipe. It, too, was designed and engineered for a single purpose . . . to carry water more efficiently.

J-M engineers combined asbestos and cement under great pressure, produced a material that did a better job. The new material was called Transite. Transite is rustproof, it cannot tuberculate, it resists even the most corrosive soils.

Then they designed a coupling made of Transite and named it the Simplex Coupling. Simple and effective, it consists only of a Transite sleeve and two rubber rings tightly compressed into position between sleeve and pipe. This construction guards against leakage and also provides flexibility at each joint. The flexibility helps to cushion the entire line against shock and soil stresses, permits a deflection up to 5 degrees at each joint.

Today you can have the engineering progress that goes into a streamlined car when you travel today's highways. Probably you'll want the advantages of modern engineering in the field of water transportation too.

Then remember this important fact. *Transite Pressure Pipe was engineered for the single purpose of transporting water more efficiently.*

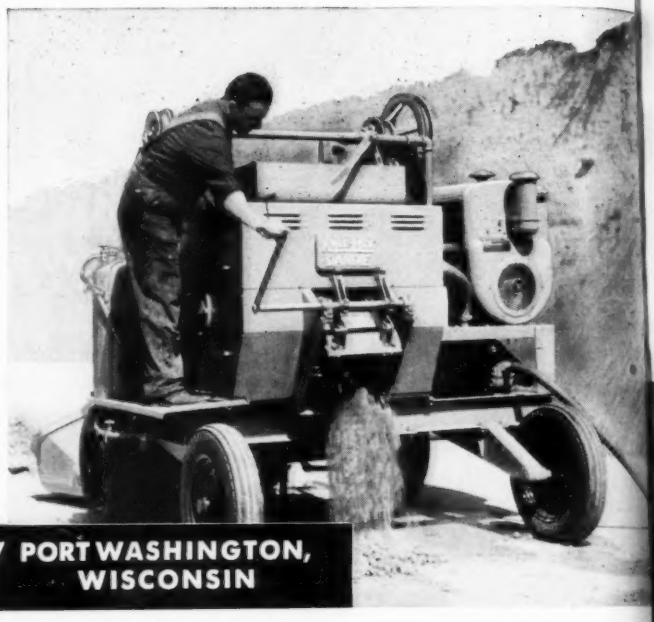
For all the facts about Transite, the *modern* water pipe, write Johns-Manville, Box 290, New York 16, New York.

JOHNS-MANVILLE JM PRODUCTS

4 Modern Tools to Cut

END DISCHARGE SAVES PATCHING TIME with KWIK-MIX BITUMINOUS MIXER

Kwik-Mix Bituminous Mixers materially reduce patching time, because they combine two important time-saving features: (1) End Discharge, (2) Non-Tilting Discharge. End discharge makes possible direct pouring of mix into break. No wheelbarrow is needed. Because of end discharge, mixer never is pulled through new patch. Non-tilting feature speeds discharge every batch. Full drum is emptied in seven seconds through big discharge door. Door easily opened with one hand. Back-breaking tilting is eliminated. Operator fatigue near end of shift and resulting production loss is eliminated.

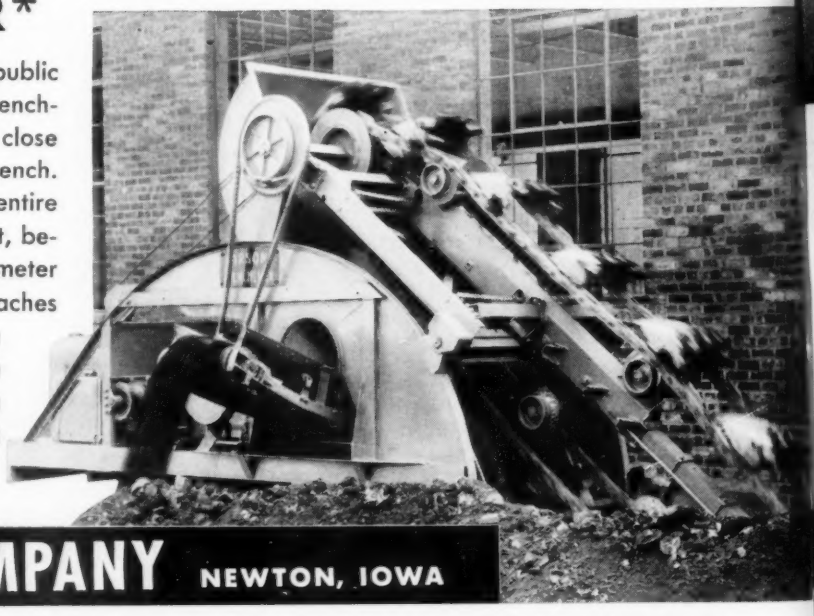


KWIK-MIX COMPANY PORT WASHINGTON, WISCONSIN

IDEAL FOR CITY WORK . . . *Parsons* 221 TRENCHLINER*

The new Parsons 221 Trenchliner, public service model in the Parsons line of trenchers, sidesteps surface obstructions as close as 10" to either side of the projected trench. Boom shifts from side to side across entire width of boom carriage. Easy to shift, because it rides smoothly on big diameter rollers. Arc type spoil conveyor reaches up 6' 9", easily dumps into 1½-ton trucks. Telescoping ladder type boom can dig over and under obstructing pipes in trench, virtually eliminating hand work.

*T/M REG. U. S. PAT. OFF.



PARSONS COMPANY NEWTON, IOWA

YOUR Maintenance Costs

Preventive maintenance with KOEHRING MUD-JACK pays BIG DIVIDENDS

T/M REG. U. S. PAT. OFF.

Koehring Mud-Jack reduces maintenance costs on concrete street slabs, sidewalks, curbs and gutters. Sunken slabs, sidewalks, curbs and gutters can economically be raised to grade before weakened subgrade conditions can cause damage. Through small holes drilled into depressed slab Mud-Jack pumps inexpensive cement-sand slurry to replace firm foundation beneath concrete. Cost of Mud-Jack maintenance is but a fraction of replacement cost. Koehring No. 10 Mud-Jacks and Koehring No. 50 Mud-Jacks are used by cities, towns and counties throughout the U. S.

HEAVY-DUTY *Handyman*

In the Koehring 205, the new Heavy-Duty Half Yard, exceptionally heavy construction for a machine of its size is combined with all the half yard features that make this model ideal for city yard and maintenance work. Independent traction and fast swing step up output when 205 works as crane or clamshell, handling aggregates, pipe, lumber. Chain-driven double cable crowd gets extra power to dipper when 205 is used as shovel. Completely and easily convertible. Available on crawlers or on truck chassis as a one-man operated Cruiser Crane.

KOEHRING COMPANY MILWAUKEE 10, WISCONSIN

782

In One Sewage Job After Another Springfield Chooses MORRIS Centrifugal Pumps

TWENTY-TWO years ago the city of Springfield, Massachusetts, first installed three Morris pumps in a sewage pumping station. Later in other pumping stations, four successive installations were made—all marking the continuing satisfactory performance of Morris pumps for varying requirements and under different operating conditions.

What Morris Pumps Do in Springfield

In one station, three Morris Pumps lift sewage and surface water to discharge the flow into the Connecticut River when flood gates are closed in the outfall sewer.

In another station, built to serve a single street, the sewage flows by gravity from the street into the wet well of the station. It is then pumped back into the main sewer system by two Morris Pumps.

In the third station, built below ground, the sanitary sewage from a low area of approximately 230 acres is lifted by two Morris Pumps about 20 feet into the main sewer system.

The fourth station with Morris Pumps serves a low area similar to the third station.

The fifth station is a Main Sewage Treatment Plant. Here a large Morris stand-by pump handles surface drainage. On occasion it also empties primary settling tanks.

Municipalities all over the country have learned to specify Morris Pumps, because of their efficiency, economy, long life and consistent output. Feel free to consult our engineers about your particular needs.

Large Cities Everywhere Depend on Morris Pumps

MORRIS MACHINE WORKS
Sales Offices in Principal Cities
Baldwinsville, N. Y.

10 Morris Pumps in Five Different Stations

Station #1—1925

Three Morris Pumps, 24 in. suction and discharge, vertically driven by 100 HP electric motors. Each pump has capacity of 13,500 GPM against a head of 20 feet.

Station #2—1925

Two Morris self-contained, vertical, submerged pumps with a 5 inch suction and 4 inch discharge. Driven by 10 HP electric motors, they deliver 500 GPM against a total head of 40 feet.

Station #3—1935

Two Morris Pumps, 6 in. suction and discharge, driven by 7½ HP electric motors through a vertical shaft. Each pump discharges 700 GPM against a total head of 20 feet.

Station #4—1938

Two Morris Pumps, vertically driven, powered by 15 HP electric motors. Each pump has 6 in. suction and discharge, and delivers 750 GPM against a total head of 50 feet.

Station #5—1940

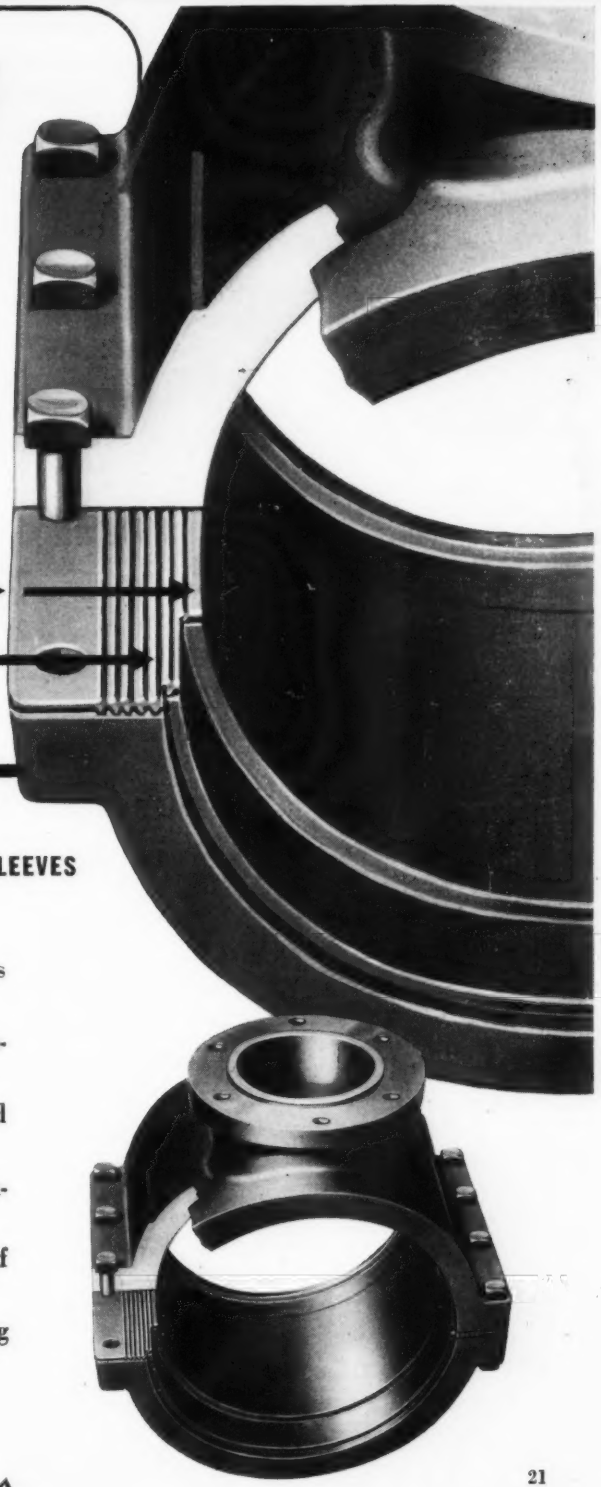
One large Morris Pump (stand-by) has a capacity of 6300 GPM against a total head of 37 feet. Suction diameter is 16 inches; discharge diameter, 14 inches. It is horizontally driven, through a reduction gear, by a 125 HP gasoline engine.

MORRIS Centrifugal Pumps

NEW!

*RIBBED GASKET PREVENTS LEAKS AND STRAINS

1. ***COVERS FULL WIDTH AND LENGTH OF FLANGE***
2. ***RAISED PREFORMED RIBS***



FURNISHED WITH ALL SMITH BOLTED TAPPING SLEEVES

The raised ribs are the unique feature of this new lead gasket. When the sleeve halves are assembled on the main, the raised ribs are compressed *first* and then the balance of the gasket is compressed, assuring a permanently tight, leak-proof sleeve assembly, free from strains and casting distortion.

* Patent Applied For

21

FIRE HYDRANTS
GATE VALVES
CHECK VALVES
INSERTING VALVES
TAPPING SLEEVES AND VALVES
WATER SERVICE BRASS GOODS

THE A. P. SMITH MFG. CO.

EAST ORANGE, NEW JERSEY

FLOOR STANDS
INDICATOR POSTS
TAPPING MACHINES
INSERTING MACHINES
PIPE CUTTING MACHINES
CORPORATION TAPPING MACHINES

You Are Cordially Invited to Visit A. P. Smith Booth 55 at the San Francisco Convention

XUM

CHAPMAN
STANDARD SLUICE GATES

Are Easy to Operate
Easy to Install
Easy to Maintain

There's no operation problem with Chapman Standard Sluice Gates . . . they're available with any one of three types of operating control—manual, hydraulic cylinder, or motor unit. The motor unit is wired at the factory —ready to install, and has a handwheel for emergency operation should power fail.

All stems and couplings are completely interchangeable and therefore require no match-marking. All repair and replacement parts can be easily installed in the field without alterations.

Remember, Chapman has a complete line of Sluice Gates which are designed to meet all the usual conditions . . . and many so-called special patterns are included. You can usually find what you need in the Chapman Standard Line; if not, Chapman engineers will be glad to work with you on your special problems. Write today for full information.

THE
CHAPMAN VALVE Mfg. Co.
INDIAN ORCHARD, MASSACHUSETTS

36" cast iron cement lined flanged discharge header at Houston, Texas, connecting with 36" main of Mono-Cast Centrifugal Pipe. Economical and corrosion-resistant, Acipco Mono-Cast pipe and fittings are cast in diameters 3" through 48", inclusive, and are supplied with or without tar coating, cement or Enameline lining.

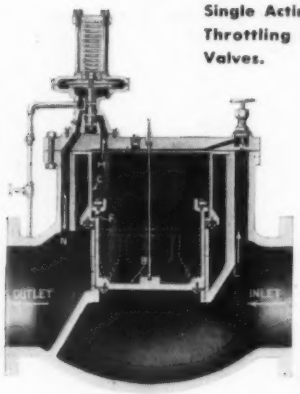
For Superior Service and Long Life at Low Cost Specify Acipco Mono-Cast Pipe and Fittings

Mono-Cast Pipe is centrifugally cast in sand-lined molds—a process which produces a pipe of superior metal structure that is strong, dense, fine-grained, free of inclusions and blowholes, and tough though easily machined. It is unexcelled for conveying gas, oil, water, sewage and other liquids. In addition to the flanged joint, Mono-Cast Pipe is available with five other types of standard joints: Bell and Spigot, Doublex Simplex, Screw-Gland, Roll-On-Rubber Ring and Molox Ball and Socket. These joints and a full line of standard accessory fittings make it easy to install under varying service and laying conditions.

AMERICAN CAST IRON PIPE COMPANY

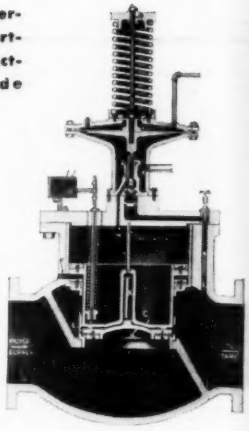
Birmingham 2, Alabama

Golden-Anderson Single Acting Semi-Throttling Altitude Valves.



For New Construction or Rehabilitation

Golden-Anderson Stop Starter Single Acting Altitude Valves.



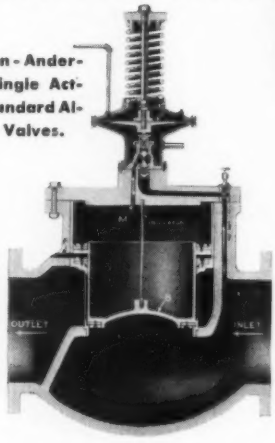
STANDARDIZE ON

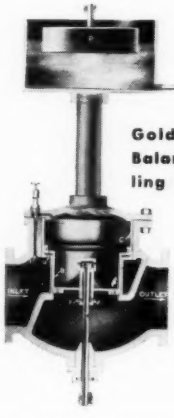
GOLDEN-ANDERSON

VALVES

for Engineered Protection

Golden-Anderson Single Acting Standard Altitude Valves.





Golden-Anderson Balanced Controlling Float Valves.

A dependable source for your most Important Valve Requirements

Golden-Anderson Altitude Control Valves require no floats or complicated fixtures in their installation. They can be easily installed and protected from inclement weather to assure unfailing water service control under any climatic conditions. Sensitive operation is another outstanding feature—they faithfully maintain water levels within 3″ to 12″ variation and may be arranged with auxiliary equipment to perform a multiplicity of services. Write for latest technical catalog.

Let Golden-Anderson Engineers aid in your Planning

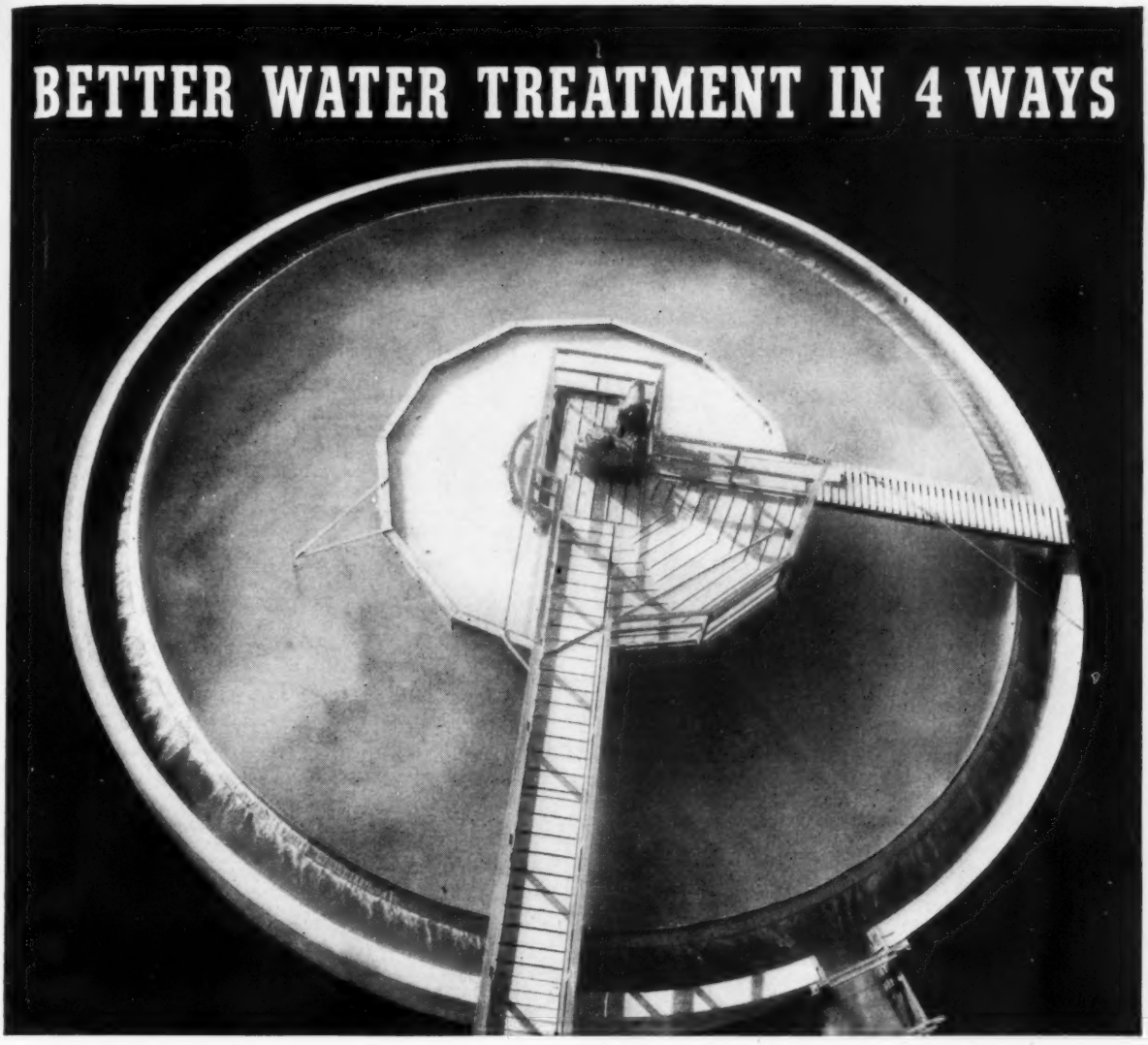
Our engineers are available to aid in the successful solution of *any* difficult valve problem.

GA

GOLDEN-ANDERSON VALVE Specialty Company
PITTSBURGH 22, PA.

write for descriptive technical catalog

BETTER WATER TREATMENT IN 4 WAYS



ACCELATOR* THE MODERN WATER TREATING PLANT SOFTENS • CLARIFIES • STABILIZES

1. BETTER WATER is regularly reported from ACCELATOR treating plants. Filter runs are longer, and filter bed life is longer.

2. LESS SPACE is occupied by the ACCELATOR, because the former separate steps of quick mixing, coagulating, settling, and sludge removal are combined in one compact unit. The saving in space amounts to as much as 80% in most cases.

3. LOWER CONSTRUCTION COSTS result from the space-saving compact unit feature of the ACCELATOR. There is considerably less concrete structure.

4. SIMPLER OPERATION is due to the automatic features of the ACCELATOR. It maintains at all times the optimum conditions for chemical treatment of water, provides for mixing, ample reaction time, effective clarification and automatic sludge removal.

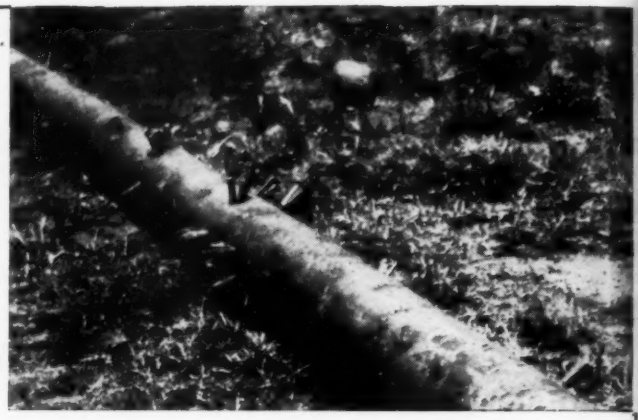
Send for a copy of ACCELATOR Bulletin 1824. INFILCO Inc., 325 W. 25th Place, Chicago 16, Ill.

*Trade-Mark Reg. U.S. Pat. Off.

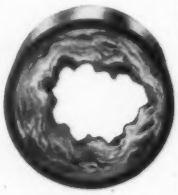
IF YOU WANT TO KNOW — ASK INFILCO

STOP THOSE LEAKS

DON'T replace that leaky Pipeline . . . even if it is like this →



Section of Pipeline Showing Redwood Plugs Stopping Leaks. BELIEVE IT OR NOT! This same Pipe was Cement Lined IN PLACE by TATE PROCESS . . . Now Leak and Corrosion Proof and will give new pipe-like performance for many years.



No matter whether your pipelines are leaky like the above, or corroded like that at left, they can be cleaned and cement lined just where they lie and made like this →

What TATE PROCESSING your pipelines means to you

1. Water pipelines may be cleaned and cement lined without removal.
2. Protective coatings one quarter inch or more in thickness.
3. Cement lining compacted under pressure of upwards to 130 pounds to square inch. Assuring maximum density of coating.
4. Leak problems eliminated. Cement lined mains cannot corrode.
5. Pumping costs reduced to minimum. Capacities restored.
6. A "TATE" lined pipe gives new pipe-like performance, for only portion of new pipeline cost.

This Method of Rejuvenation of Existing Pipelines is Being Used Extensively the World over . . . Why Not Consult Us, Without Obligation—For further particulars and prices.

TATE PIPE LININGS, Inc., Andover, Massachusetts

CALIF. REPRESENTATIVE: 849 E. Lime Ave. • Monrovia • Phone Monrovia 1-3913

TATE PROCESSES Operated in United States of America, England, South Africa, Australia, New Zealand.

KEEP SEWERS OPEN with OK CHAMPION POWER SEWER CLEANER

OPEN

CLOSED

Town and City officials throughout America are adopting OK CHAMPION Power Sewer Cleaner to keep sewers clean and efficient. Takes roots, dirt, sand, and other debris up from main in one continuous operation. All men work above street level.

Pulling forward opens the jaws that bite into obstructions. Reversing the pull on the bucket automatically closes jaws which hold load pulled back to street level. Write for complete details.

CHAMPION CORPORATION 4716 SHEFFIELD HAMMOND, IND.

Cast Iron Pipe

PLAIN CAST OR SPUN CENTRIFUGAL

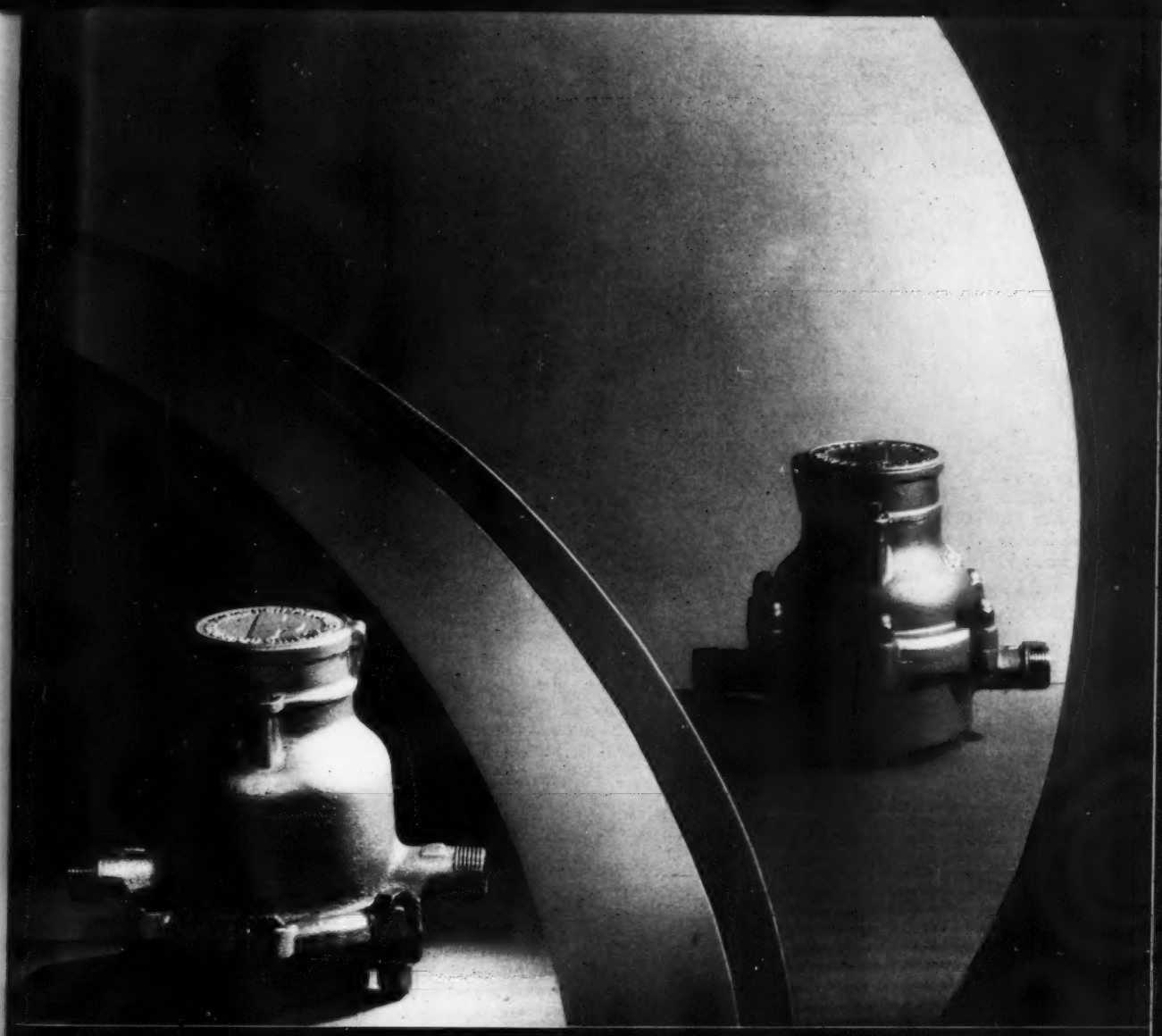
Cast Iron Pipe and Special Castings, Bell and Spigot, Flange, Flexible Joint, Culvert, Milled and Plain End Tubes, Cylinders, Flanged and Bell and Spigot Fittings, High Pressure Fire Service Pipe, Warren Short Body Specials, Threaded End Pipe.

Size 2 to 84-inch

Pipe manufactured in accordance with standard specifications adopted and approved by water works associations and engineers.

Warren Foundry & Pipe Corp.
11 Broadway, New York City

Warren Pipe Co. of Massachusetts
75 Federal Street, Boston, Mass.



HERSEY

From the deep South to the frozen North — from the Atlantic to the Pacific — experienced Water Works Officials not only recommend but specify

HERSEY WATER METERS

They know that the quality of materials is never cheapened to meet price competition, and that these meters are both accurate and long-lasting, reducing maintenance costs to a minimum.

HERSEY MANUFACTURING COMPANY

SOUTH BOSTON, MASS.

BRANCH OFFICES: NEW YORK — PORTLAND, ORE. — PHILADELPHIA — ATLANTA — DALLAS — CHICAGO SAN FRANCICSO — LOS ANGELES

XUM

7 ways

to cut Sewage Disposal Costs with TRANSITE SEWER PIPE

IF YOU ARE SEEKING WAYS to lower sewage disposal costs, you will be interested in the opportunities for savings offered through the use of Transite* Sewer Pipe. Check these 7 important economies, all of them possible with Transite:

1. Lower excavation costs. Transite's low-friction coefficient (n=.010) provides greater flow capacity. This frequently permits flatter grades and shallower trenches with correspondingly lower excavation costs.

2. Lower handling costs. Long 13-foot lengths and light weight mean greater footage per truckload . . . less time required for unloading and lowering the pipe into the trench.

3. Lower pipe laying costs. Four classes of pipe, to meet a wide range of strength requirements for all loading conditions, minimize the need for costly concrete cradles. And Transite's long lengths mean fewer joints to assemble . . . less time for laying to line and grade.

4. Use of smaller diameter pipe. Transite's tight sleeve type joints are an effective safeguard against infiltration. Thus the total sewage load is reduced, which, coupled with Transite's higher flow capacity, makes possible the use of a smaller diameter pipe.

5. Minimum maintenance. Made of asbestos and cement combined by a special process, Transite Sewer Pipe is highly corrosion-resistant. Its tight joints safeguard against root trouble. And every length is factory-tested for strength and uniformity.

6. Reduced treatment costs. By cutting down on infiltration and reducing plant load, Transite helps reduce operating costs and conserve plant capacity for increased loads incident to future community growth.

7. Smaller treatment plants. Because Transite Sewer Pipe minimizes infiltration, plant capacity is more efficiently used. Where new plants are being designed, substantial savings in initial cost of construction and equipment may often be effected.

For further information, write for Brochure TR-21A. Johns-Manville, Box 290, New York 16, N.Y.

JM PRODUCT

* Reg. U. S. Pat. Off.

Fairbanks-Morse Pomona Vertical Turbine Pumps: Oil or water lubricated, with open or closed impellers—you can "figure" the right one for you.
Fairbanks-Morse Centrifugals: The broadest line, for widest variety of centrifugal pumping service.
Westco Turbine Pumps: Built with extreme accuracy for high-head pumping of almost every liquid.

How Do You "Figure" a Pump?...

"Figuring" a pump is engineer-talk for the slide-rule work necessary before deciding on the type and size of pump required to do the job at hand.

It's not easy: it involves the skilled use of almost every hydraulic formula. Equally important, it demands a familiarity with pumps and pumping problems that is broad enough to prevent oversight, deep enough to assure an answer that's *right*.

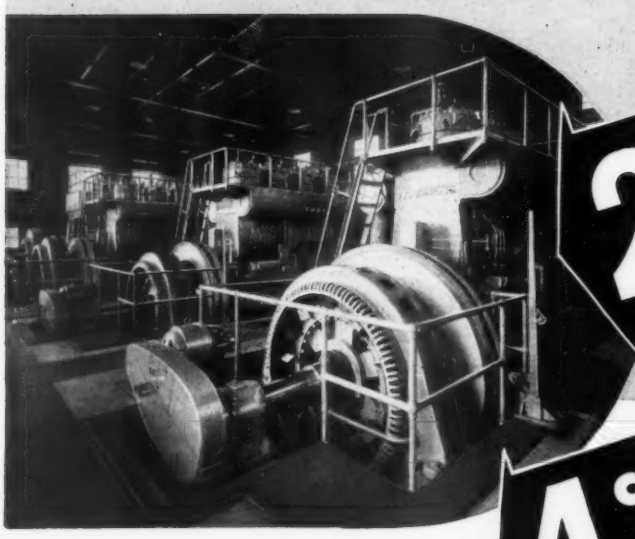
Before you "figure" *your* pumps, have a talk with your Fairbanks-Morse dealer or the pump engineer from your Fairbanks-Morse branch office. If there's a way for you to save money and gain real pumping satisfaction, they'll know how to "figure" it.

FAIRBANKS-MORSE

A name worth remembering

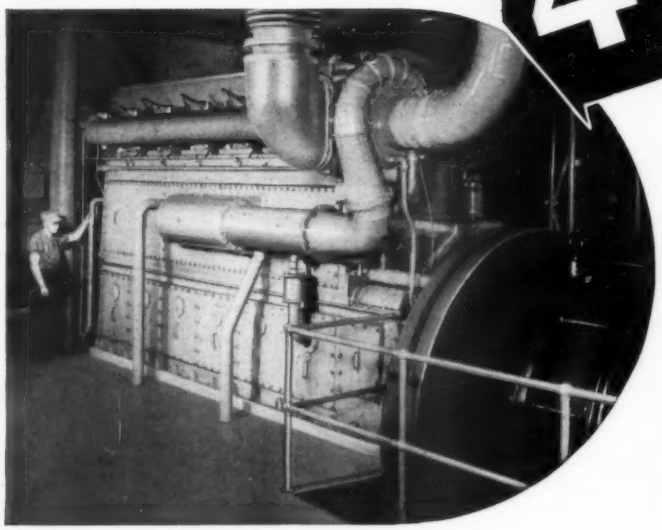
DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES • MOTORS • GENERATORS • STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS

A NORDBERG DIESEL
will supply your power needs



2 CYCLE ENGINES
Available in sizes up to 8500 B. H. P. in a single unit.

4 CYCLE ENGINES
Built in non-supercharged and supercharged designs in sizes up to 1600 B. H. P.

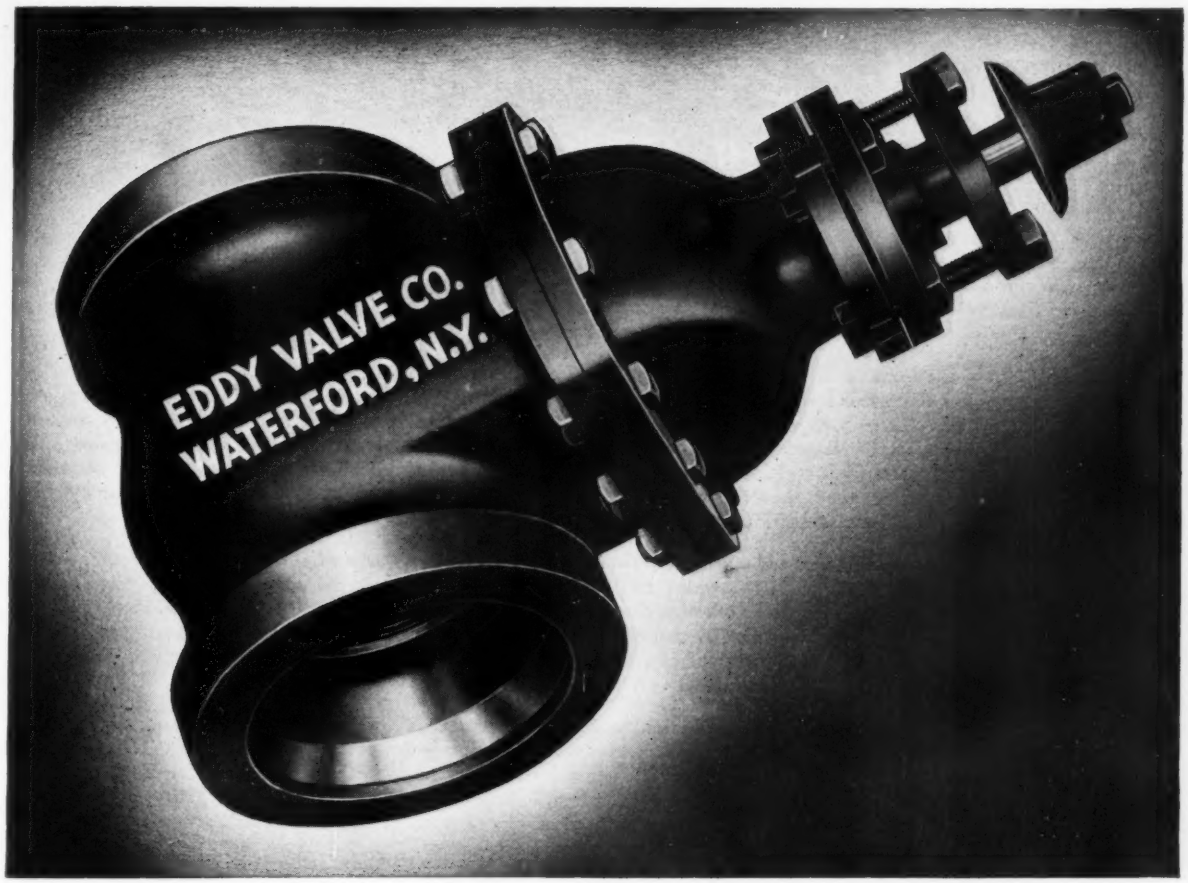


As a builder of both two and four-cycle oil or gas burning Diesel engines, Nordberg can supply the power needs of plants small and large and a type engine best suited to each requirement. Back of these engines is a record of many years of successful performance that has won for Nordberg a position of leadership in the Diesel power field. The many repeat orders from satisfied users attests to this fact. For dependable, low cost power, investigate the merits of Nordberg Diesels. Our engineers will gladly furnish further particulars on an engine to meet your power demands.

NORDBERG MFG. CO., Milwaukee 7, Wis.

NORDBERG
DIESEL ENGINES

Bury it *and forget it!*



If you will think before buying a valve—you can eliminate thinking of it forever after. When you think of valves—think of the years of time and effort we have put into giving you a smooth-operating, trouble-free valve. Think of the progressive water works men who have relied on Eddy Valves for years—then specify and insist on getting Eddy Valves—You can bury them and forget them!

EDDY VALVE COMPANY • WATERFORD, NEW YORK

A subsidiary of James B. Clow & Sons

YOUR RESPONSIBILITY PROTECTED BY LOW COST INSURANCE IN Streamline COPPER PIPE

Water works officials who are responsible for the return on a very heavy capital investment have in STREAMLINE Fittings and Copper Pipe one of the most effective and low cost forms of insurance that they can adopt. It is the ideal material for water service work.

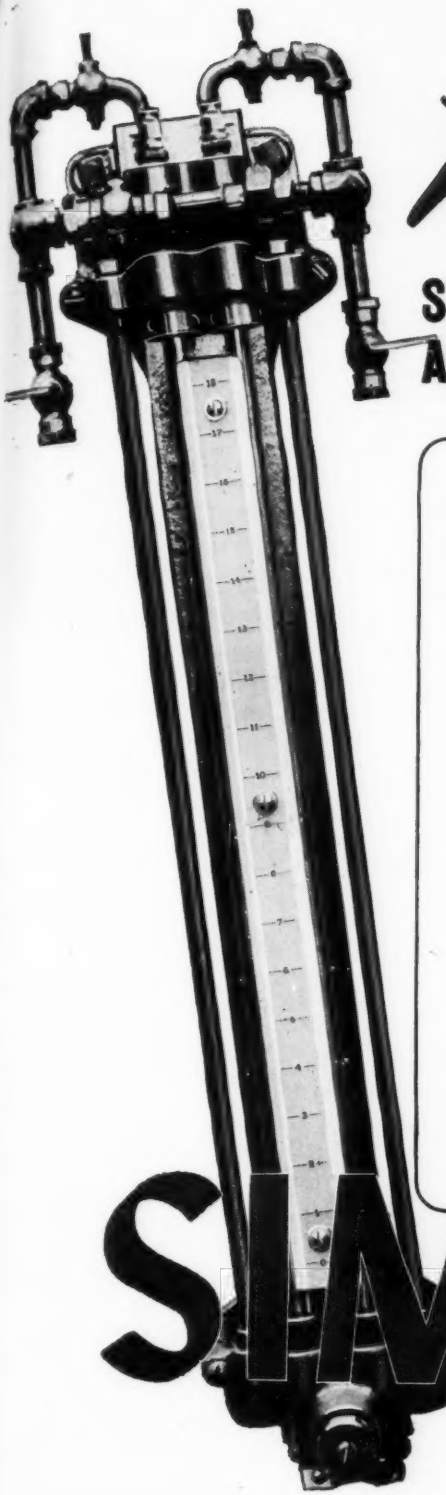
An installation of STREAMLINE Copper Pipe and Fittings does not rust. The absence of internal corrosion eliminates the clogging often found in corrodible piping owing to this condition. There is no discoloration of water from scale and rust nor decrease in volume and pressure, such as are invariably found after a few years' service with corrodible materials. A maximum delivery of water from main to meter is always obtained even after long years of service. The absence of scale and rust eliminates many costly water meter repairs and insures the accuracy and long life of meter discs and chambers.

One of the most troublesome things to a water works department is the occurence of leaks in the water service lines, brought about by continuous vibration from heavy traffic or other causes. A STREAMLINE installation is vibration proof. The effect of vibration is dissipated over the entire installation and not localized at the joints. Settlement of filled earth or of water mains very seldom affects it. Its quality of ductility prevents failure.

In addition to its non-rusting qualities, one of the most important advantages to water works officials is the fact that when STREAMLINE Copper Pipe is installed as a service line, it can practically be forgotten for years to come. It insures a lifetime, trouble-free piping system that, with the possible exception of abnormal earth or water conditions, need never be replaced.

The use of STREAMLINE Copper Pipe and Fittings for water works use for many applications in filtratian and sewage disposal plants—and for all general plumbing and heating purposes, will repay you many times over.

STREAMLINE
PIPE AND FITTINGS DIVISION
MUELLER BRASS CO.
PORT HURON, MICHIGAN



here's how

SIMPLEX TYPE MAP MANOMETERS ASSURE MEASUREMENT ACCURACY!

Be sure of accuracy — with a Simplex Type MAP Manometer! This unit has been designed especially to meet the high standards of laboratory technicians, test floor engineers, and other industrial users *where accuracy is a "must"!* Here are six of the special features of the Type MAP Manometer:

1. ***Large-diameter gauge glasses*** with accurately bored interior surfaces tending to produce a flattened meniscus!
2. ***Highly accurate scale*** permitting deflection readings of 1/100 of an inch!
3. ***Mercury dampening valve*** — essential in removing oscillations caused by line surges!
4. ***Mercury drain and filling plugs*** — for quick addition or removal of balancing liquid!
5. ***Air venting valves*** — for instant removal of air accumulations!
6. ***All-important equalizing valve*** — to enable checking and testing of instrument in place—at any time.

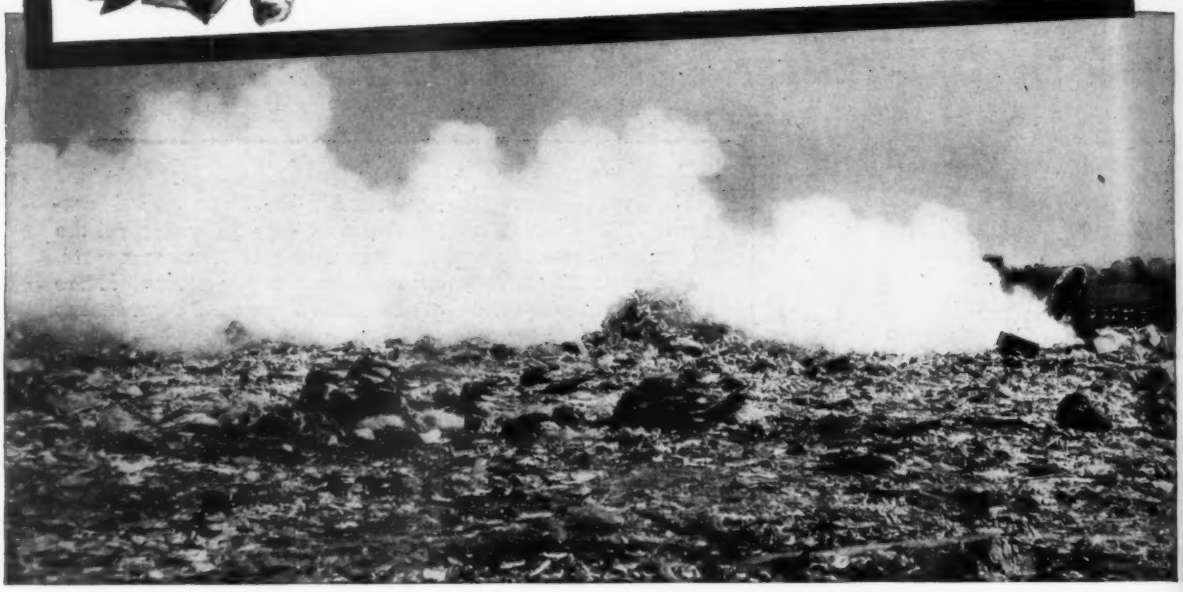
Want installation, operation facts? Write for free, illustrated copy of BULLETIN 200

SIMPLEX

TYPE MAP MANOMETERS
for application with Venturi Tubes, Flow Nozzles, or Orifice Plates.

SIMPLEX VALVE & METER COMPANY
6789 UPLAND STREET, PHILADELPHIA 42, PA.

"Yes, sir . . . THAT TIFA FOG GETS THOSE PESTS!"



. . . DEATH-DEALING FOG FOR INSECTS

TIFA is the *Quick . . . Sure . . . Economical* method of insect pest control.

TIFA discharges newly developed as well as the older insecticides, fungicides, repellents or hormones in a *true fog* that *spreads quickly* over a wide area . . . *clings* to all objects in its path . . . *permeates* the smallest crevices.

TIFA . . . a compact, easily handled one-man unit, powered by a standard-make gasoline engine . . . can be used wherever insect pest control is essential to public health and welfare . . . on garbage or fill dumps, on beaches, in parks, resorts, and swamps. And it's BUILT TO LAST.

TIFA

TODD INSECTICIDAL FOG APPLICATOR

Write for illustrated folder on sensational TIFA—full details on how it operates, what it does, and official comments on its astonishing effectiveness.

A Product of

COMBUSTION EQUIPMENT DIVISION

TODD SHIPYARDS CORPORATION

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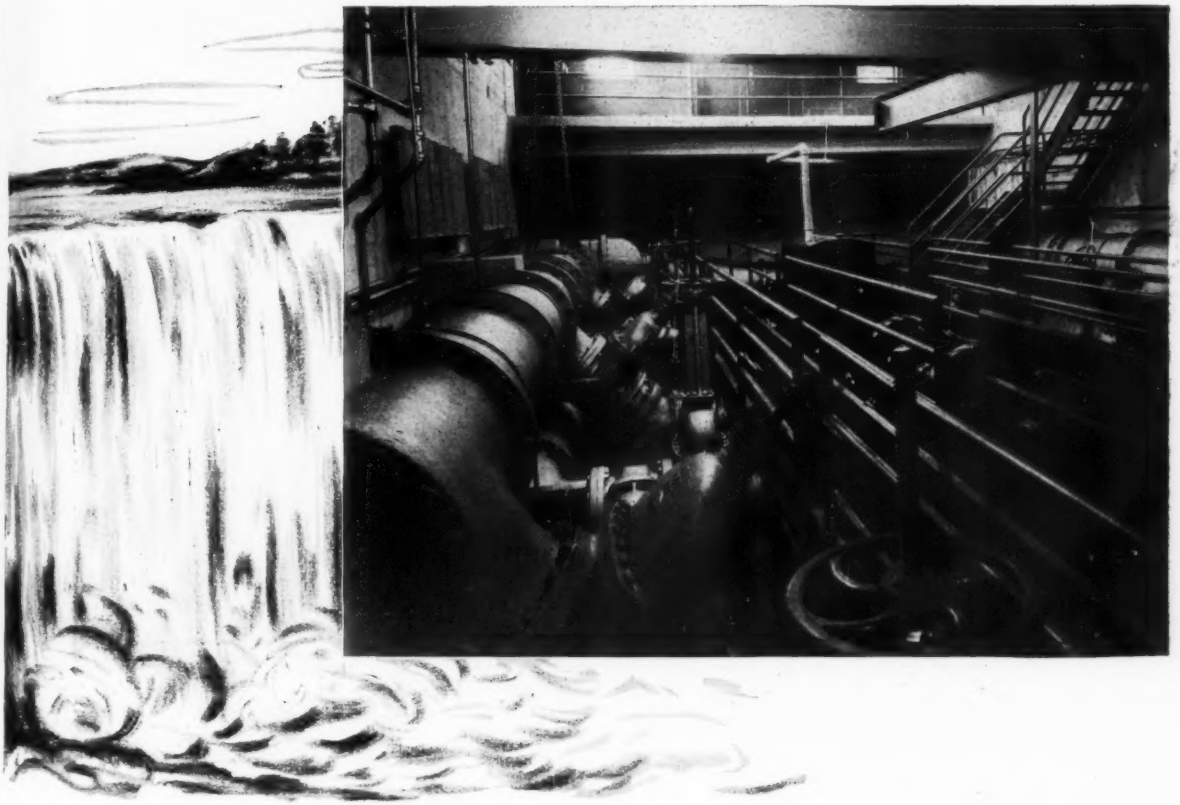
Water over the Dam . . .



controlled by LUDLOW!

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DOUBLE GATE— A.W.W.A. Specifications 2 in. to 12 in.

Also Normal Delivery on Valves in Larger Sizes and *rapid delivery* on Hydrants.

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LUDLOW engineers will be glad to talk with you about your plans for replacements or new installations. There's no obligation.

V-71

The LUDLOW VALVE SINCE 1866

MFG·CO·INC·TROY·N·Y·

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You can't buy bridges or other large drainage structures from a vending machine but here's the next thing to it.

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For a durable, economical job include ARMCO MULTI PLATE in your plans for bridges, stream enclosures, large sewers and special drainage structures. They'll save you time, trouble and money. Write today for complete data. Armco Drainage & Metal Products, Inc., 2455 Curtis Street, Middletown, Ohio.

MULTI ARMCO PLATE

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The Austin-Western Line also includes 3-Wheeled Rollers. Catalogs yours for the asking.

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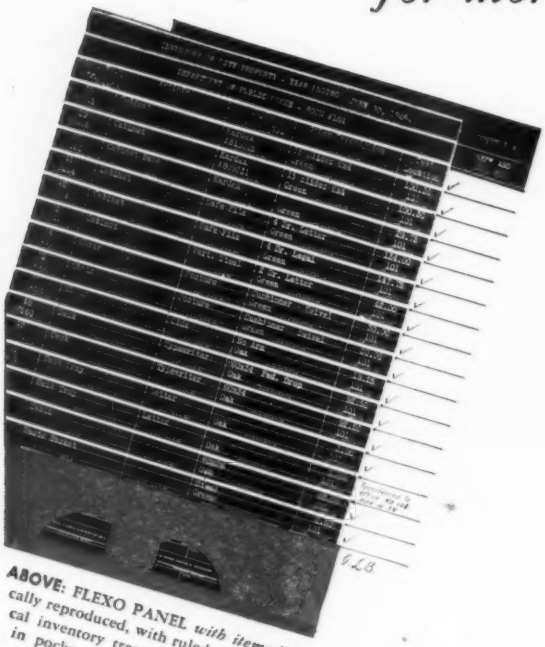
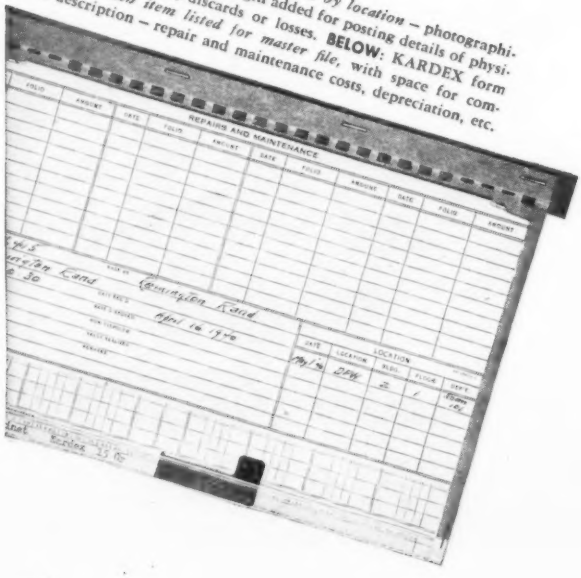
for more accuracy, positive control



ABOVE: FLEXO PANEL *with items listed by location* – photographically reproduced, with ruled margin added for posting details of physical inventory transfers, discards or losses. **BELOW:** KARDEX form in pocket – *each item listed for master file*, with space for complete description – repair and maintenance costs, depreciation, etc.



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YOUR INVENTORY RECORDS are among the most vital of all the data for which you, as a public official, are held responsible! You want to give your community the highest efficiency possible in this important administrative function, and you want to assure yourself protection against criticism and loss.

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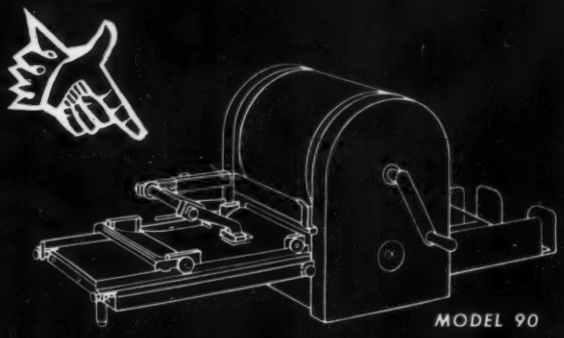

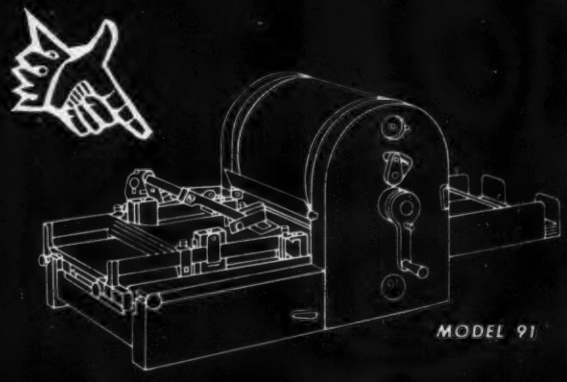

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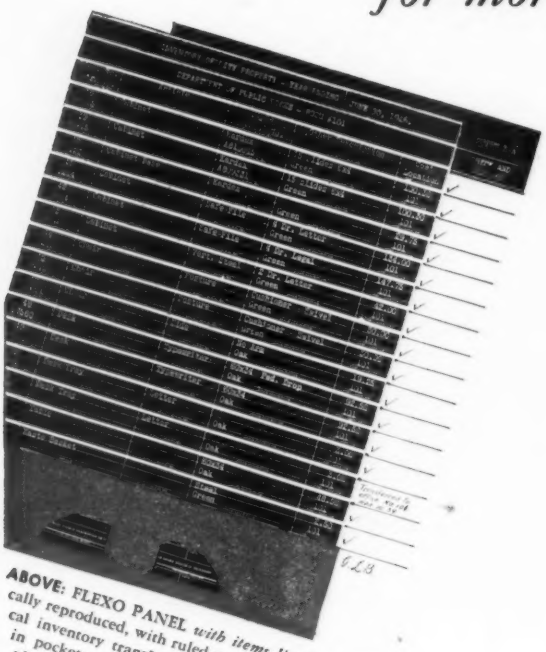

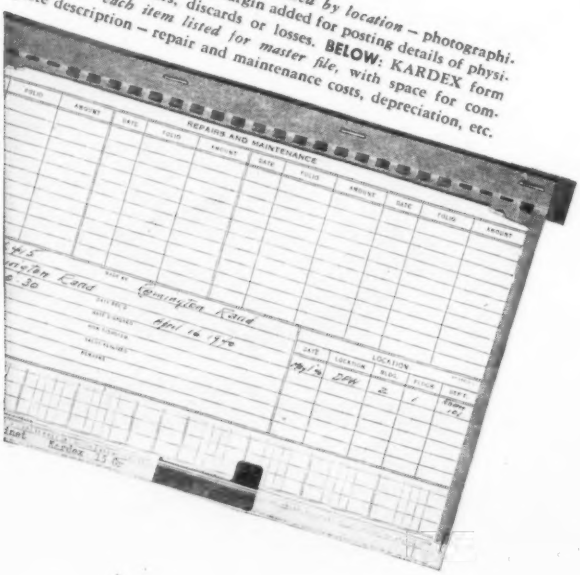

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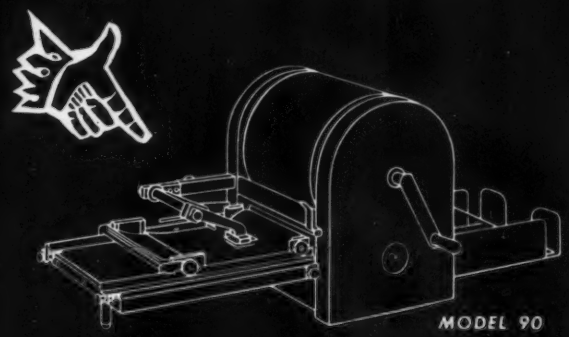
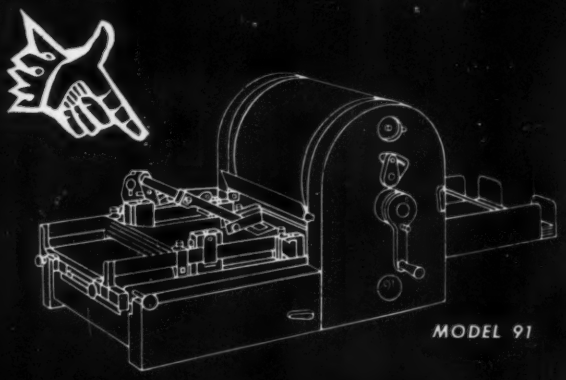
Take your choice





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Easier Stencil Preparation—
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High visibility—easier on the eyes when typing stencils and proofreading. Easier, quicker corrections.

High-quality copy, sharp letter outlines, blacker reproduction.

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Original Woodcut by Lynd Ward

Activity in subdivision developments has stepped up the demand for smaller sizes of Super-deLavaud pipe. This centrifugally-cast pipe can be handled easily and laid speedily, in either 12-foot or 18-foot lengths with bell-and-spigot or standardized mechanical joints. Thanks to the Super-deLavaud centrifugal process, the pipe is uniform, tough and strong—all of which properties contribute substantially to the established long life of cast iron pipe.

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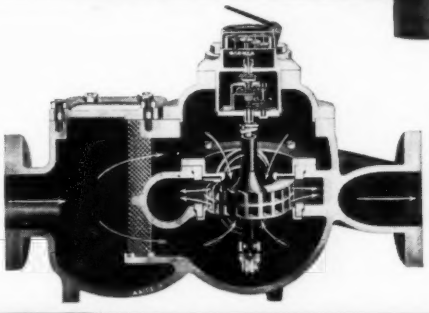

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The Model IH Turbine . . . Current or Velocity Type . . . Capacities up to 2800 gpm . . . Sizes, 2" to 8"

If your cold-water metering involves large flows, be sure to look into the advanced design of the Model IH Turbine–one of Worthington-Gamon's famous Meters.

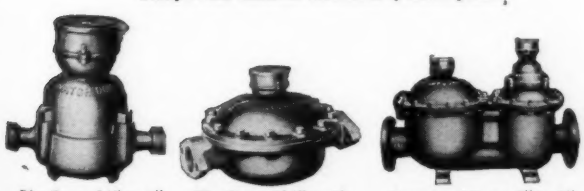
Incoming water flows to each side of a double wheel, carrying two sets of vanes. This hard rubber wheel has a phosphor bronze, rubber-pivoted shaft, turning on ball bearings. A strainer box, integral with the meter casing, is reached through a separate cover, without disturbing the measuring mechanism. The train is oil enclosed.

Hydraulic balance — axial and radial — assures continued accuracy over a wide range of flows. And the sturdy construction of the Model IH Turbine, built to specifications of American Water Works association, means years of low-cost, trouble-free service.

"WATCH DOG" WATER METERS

"Watch Dog" Models . . . made in standard capacities from 20 gpm up; frost-proof and split case models in standard household sizes. All meters of Worthington-Gamon manufacture comply with specifications of cold-water meters adopted by American Water Works Association . . . Write for Bulletin.

Made by America's First Meter Manufacturer
Today's First Choice in Thousands of Municipalities



Disc Type: ⅝" to 1" Disc Type: 1½" to 6" Compound Type: 2" to 8"

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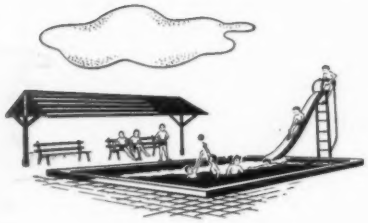
FOR THE HOUSING DEVELOPMENT

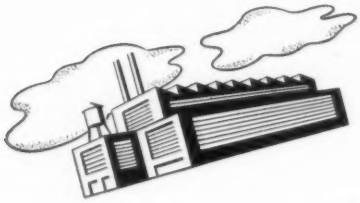
Slum clearance and unprecedented population growth in recent years have greatly increased demand for good municipal water.



FOR PLAYGROUNDS

Proposed civic centers for recreation, such as swimming pools, will require great quantities of water and it must be *good* water.

Will the WATER be good enough?

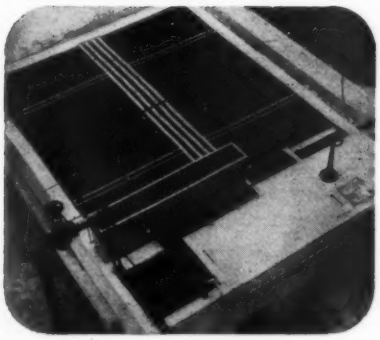


FOR NEW INDUSTRIES

To attract new business, which provides jobs, a city must provide plenty of good water, industry's most important raw material.

FOR THE AIRPORT

As air travel becomes an integral part of our living, more and more of a city's supply of treated water must be allocated for airport use.



PERMUTIT SPAULDING PRECIPITATOR removes water hardness, dirt and color by the sludge blanket process. This new-design equipment cuts detention time, saves chemicals, takes only half the space of former methods. Present installations handle up to 120,000,000 gallons daily.

In *your* city's plans for better living, what about water? Is it *good enough* to meet the many *new* demands for municipal water—from builders, from industry?

Permutit* conditioned water comes into the home, hospital, playground and factory soft . . . clear . . . iron-free. It's the best treatment a city can give its water supply.

No wonder so many municipalities have turned to Permutit for the good water called for in postwar plans of city planning commissions. For your own information, write The Permutit Company, Dept. A7, 330 West 42nd Street, New York 18, N. Y. or Permutit Co. of Canada, Ltd., Montreal

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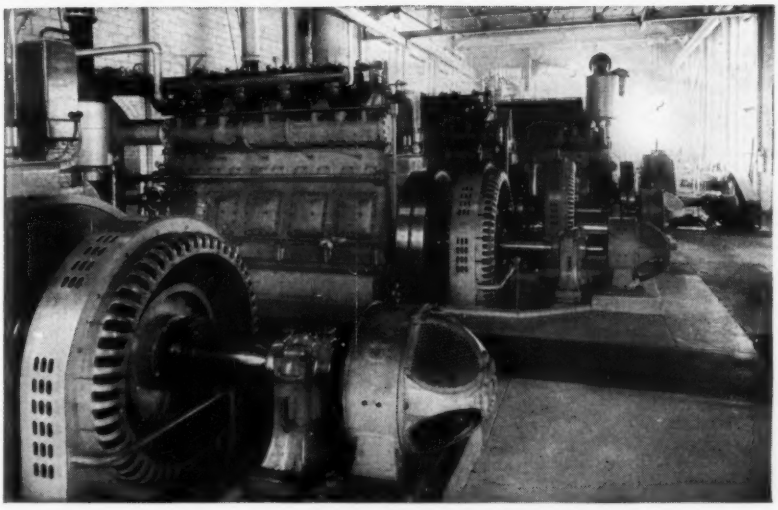
For more than 30 years **PERMUTIT**

WATER CONDITIONING HEADQUARTERS



Four Worthington 4-cycle Diesel Generating Units now operating in the Shenandoah Valley Cooperative plant.

More Worthington Diesels for Shenandoah Valley Cooperative

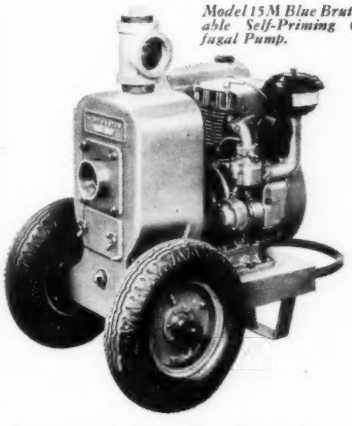
The first rural electric cooperative organization in the United States to manufacture its own current—the Shenandoah Valley Electric Cooperative, serving more than 5,200 consumers in Virginia—has a program for nearly doubling its generating capacity, and has selected Worthington equipment for the purpose.

The present sub-station and switchboard at the plant in Dayton, Virginia, will be replaced with equipment to handle about three times more voltage.

At present, the machinery that produces the electricity is driven by five Diesel engines. The present 2,300 kw generating capacity will be increased by 2,000 kw.

The original installation, in 1937, consisted of three Worthington Diesel Generator units, a 250 hp DS-3 driving a 170 kw generator, a 415 hp DS-5 driving a 285 kw generator, and a 500 hp DS-6 driving a 345 kw generator.

The load grew, and in 1939 Worthington furnished a 1,000 hp EE-8 driving a 700 kw generator. The present order calls for three 1,685 hp SEH-8 units to drive 1,180 kw generators at 360 rpm.



Model 15M Blue Brute Portable Self-Priming Centrifugal Pump.

New Portable Self-Priming Centrifugal Pump

Fast self-priming without re-circulation is the big feature of the new Blue Brute Portable Centrifugal Pumps. Most pumps of this type prime themselves by re-circulating water from the discharge side of the casing back to the impeller suction through priming ports. Blue Brute pumps have none of these troublesome devices. They prime without them.

Basically these pumps are all steel. The casings are fabricated of rust and abrasion resisting steel with smooth, streamlined internal waterways and pleasing external appearance. The impellers are cast of a hard, tough alloy iron and the casings are equipped with renewable hardened wear plates, easily replaced when they have become too badly worn. The entire unit is mounted on a rigid steel base and all sizes except the 1½"-3M rating are equipped with two pneumatic tired wheels.

Blue Brute Portable Self-Priming Centrifugal Pumps conform in all respects to the standards for this type of pump adopted by Contractors' Pump Bureau of the Associated General Contractors of America, Inc., and each unit carries an A.G.C. rating plate which certifies that the pump meets the rigid requirements that have been established. Pumps will be available in all A.G.C. ratings from 1½"-3M to 4"-40M, with larger pumps to follow later.

All pumps are equipped with air-cooled gasoline engines—single cylinder on 1½", 2" and 3" pumps and four cylinder V-type on 4" pumps.

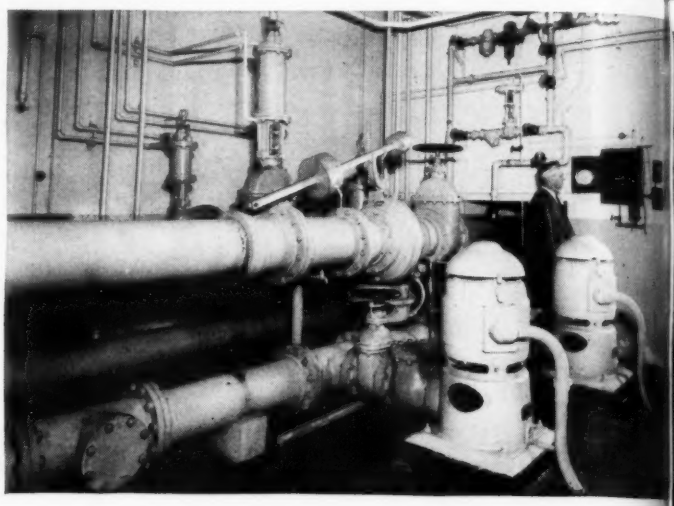
NEWS

FROM THE PUBLIC WORKS FRONT

AS REPORTED BY THE DEVELOPMENT ENGINEERS, FIELD SERVICE REPRESENTATIVES AND CUSTOMERS OF WORTHINGTON

NEWS from the public works front

Two Worthington Vertical Turbine Pumps in new filter plant at Culpeper, Va.



Culpeper Pumps with Worthingtons

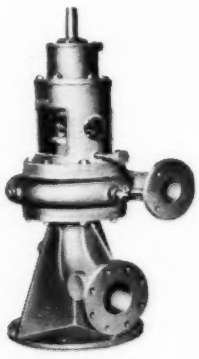
Deep well type turbine pumps furnished by Worthington carry river water to and from the new filter plant installed by the Town of Culpeper, Va.

This plant has a capacity of one million gallons per day, consisting of two one-half million gallon filter units.

The water supply is taken from Mountain Run, a stream approximately 1,000 ft. from the filter plant. A special screened intake structure in the stream permits taking all water, if necessary, during drought periods and the storing of water in the stream bed during periods when the filter plant is not in operation. A 12-in. cast-iron gravity raw water line extends from the intake to the raw water well under the ground floor of the filter building. Two raw water pumps of the deep well turbine type deliver the raw water to the coagulating or settling basins. These pumps have a capacity of 350 gpm each.

The filtered water is pumped to the distribution system and the water storage stand pipe from the clear well by two deep well type turbine pumps, each having a capacity of 350 gpm. Provision has been made for the installation of additional pumps when the water demand increases.

Worthington Centrifugal Pump for pumping sewage.



New Line of Sewage Pumps Announced by Worthington

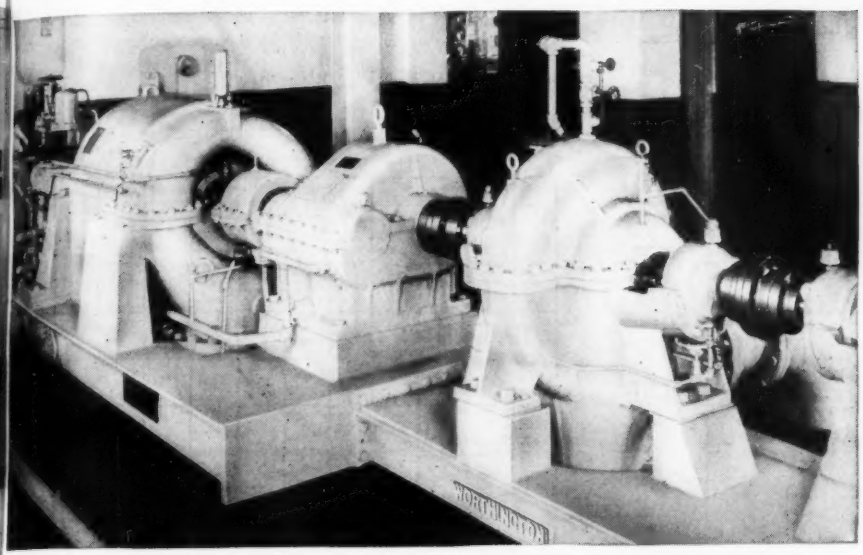
A new line of "dry pit" centrifugal sewage pumps has been introduced by Worthington. The line consists of seven sizes for each of three types, covering the complete range of requirements. Designs have been standardized for maximum interchangeability of parts.

Features of this line include the following: renewable shaft sleeve, heavy-duty ball bearings, positive grease lubrication, non-clogging impeller, and rugged casing.

Line drawings, scale ⅜ in. to 1 in., suitable for tracing in plans, are available to consulting engineers upon request. Also descriptive bulletin W-317-B10.

Straightening Out Highway 37

6 miles of new highway are being built between Indianapolis and Bloomington to straighten out Highway 37. The photo shows two Worthington Blue Brute UMW40 Wagon Drills being driven by two 315 cu ft Blue Brute portable compressors. The contractor is John Bloomer Construction Co., Appleton, Wisc.



9 mgd Worthington Turbine Centrifugal Pump at York Water Company's pumping station installed in 1946.

30 MGD is Worthington Record at York, Pa.

e of the outstanding water works in the intry is the plant of York Water Company York, Pa., serving 22,884 connections ough 169 miles of mains. The pumping ion is completely equipped with Worthton pumping units.

An early pumping installation using superted steam was made in 1915—a horizontal ss compound crank and flywheel pumping gine designed for 8 mgd against 312 ft TDH. Two later Worthington installations were made—a horizontal cross compound crank and flywheel pumping engine rated at 5 mgd against 325 ft TDH and a turbine centrifugal unit rated at mgd against 325 ft TDH. In 1946, a second turbine centrifugal was added, rated at 9 mgd against 325 ft TDH. This unit developed a duty of 169 million ft-lb of work per 100 lb superheated steam.

Thus the present Worthington pumping equipment has an aggregate capacity of 30 mgd.

Low Pressure Turbines Power Capitol Air Conditioning

The pumps that serve the air conditioning system here are driven by Worthington-Moore Steam Turbines.

In the power plant connected with the United States Capitol and surrounding buildings Worthington-Moore steam turbines are used to drive the chilled water and condenser water pumps serving the air conditioning system.

Each of the two chilled water pump turbines is rated at 800 hp, and is equipped with separate reduction gears. The turbines operate at 4500 rpm, and the gears reduce the speed to 1450 rpm.

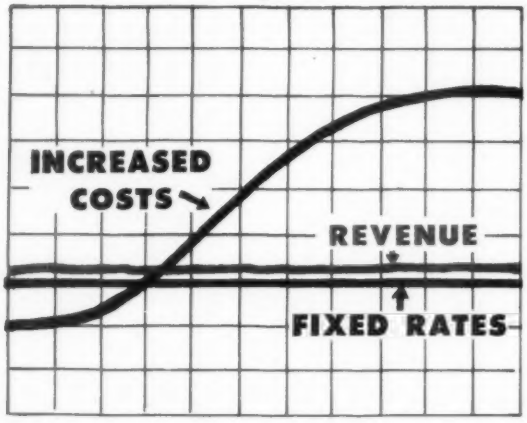
The condenser water pump turbines are rated at 511 hp. They operate at 4500 rpm, and gears reduce the speed to 800 rpm.

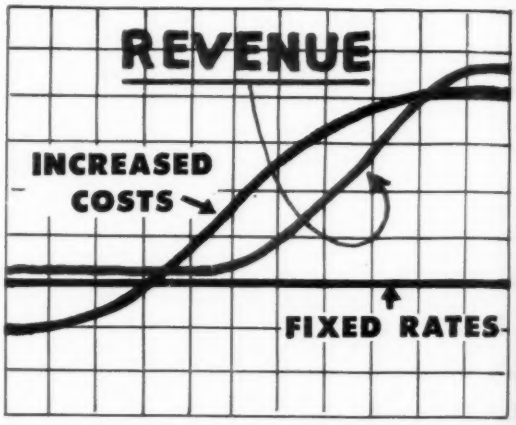
In both cases, the turbines operate on steam at 40 lb pressure and exhaust into a vacuum of 26 in.

All four turbines were installed in 1937, and they are used approximately 6 months a year, an average of 16 hours per day.

XUM

WELL LAID PLANS MAY CHANGE *this picture..... to this!*





by reducing unaccounted-for water

For instance — a city in Wisconsin realized that with meters recording only 74% of the water pumped, a great deal of revenue was running to waste. Through research, experiment, planning and hard work, registration and revenues gradually increased until sufficient reserves had been accumulated to permit a *reduction* in water rates of 6.6%. At last report a registration of 92.78% had been reached.

True, your town may never be able to REDUCE your water rates — but you CAN probably materially increase your revenue by reducing UNACCOUNTED-FOR WATER, as this and many other towns and cities have done, through a systematic program of meter inspection and repair. Accounting for 85% of the water you pump is not too much to expect when leakage is properly controlled and domestic meters register 90% at ¼ gpm. For assistance in putting such a program into operation, see your Trident representative.

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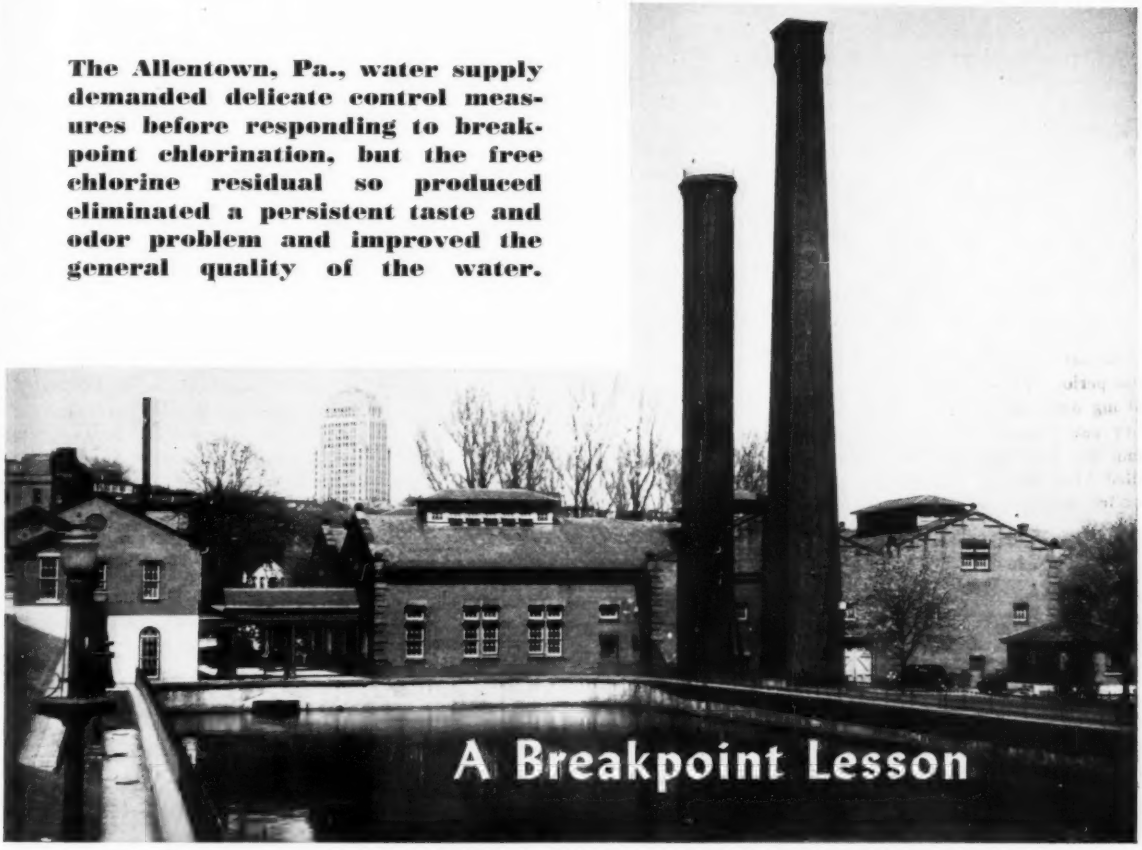
Volume LXII Number 7
JULY 1947
The American City

The Allentown, Pa., water supply demanded delicate control measures before responding to breakpoint chlorination, but the free chlorine residual so produced eliminated a persistent taste and odor problem and improved the general quality of the water.



A Breakpoint Lesson

The filter plant and one of Allentown's two reservoirs, which is fed by Crystal Spring.

By HARRY KRUM
City Chemist, Allentown Water Supply
Allentown, Pa.

BREAKPOINT chlorination was catalogued in my dictionary of technical terms as largely a conversational word until about a year ago. There was no question of the theory behind it. I could understand how a residual of "free" chlorine could be produced that would burn up the organic nitrogen and other taste-producing elements, and I could see how, theoretically, this chlorine could be administered so accurately that it would do this task exactly and leave only a relatively small residual for the distribution system.

But from a practical standpoint, I didn't see how it was possible to produce those refined residual determinations without a corps of laboratory technicians big enough to drink the entire water supply, and each one with an eye for color that you find only in an artist or a housewife.

And it wouldn't have been possible either, if some of my friends at one of the waterworks meetings hadn't pointed out the Hallinan test to govern breakpoint chlorination using a Klett Summerson photoelectric colormeter. This test and the equipment took the "guess" right out of the colorometric determinations and made it possible for me to hang our water supply right on the breakpoint and leave it there. It made us able to whip a taste and odor problem resulting from algae that most of us had become more or less resigned to, and it cut the number of samples showing 48-hour gas to less than 5% of the determinations existing previously.

Has Three Supplies

Allentown, Pa., draws water from three different sources. The first of these, Crystal Spring, is a flowing well producing roughly 3 mgd and is located at the place of the present treatment plant. The second, Schantz's Spring, produces about 8 mgd through a flowing well. Both springs flow into basins, each with about 2-mgd capacity. The third supply is the Little Lehigh River, from which we draw about 10 mgd, or whatever is required to make

up the balance of the Allentown demand. We use all the water from the springs because they require no treatment other than chlorination, and we run the balance through our filter plant.

On the surface, this would appear that there would be a wide variation in the character of the water because of the differing sources. Actually, this is not the case. All three supplies come from the same watershed and all have approximately the same characteristics —roughly 175 ppm of total hardness, 140 ppm alkalinity as $CaCO_3$, a pH of 7.5, and only a trace of iron and manganese. Except for hardness, the water is exceptionally good in quality.

The river water has a normal turbidity of 10 ppm, but at times a heavy rainfall will run this turbidity up to a figure as high as 5,000 ppm. However, when it goes above 500 ppm, we shut the filter plant down and let our finished water reservoirs carry us through this period. We have two of these, one 30 mg and one 10 mg, located so that they can float on our distribution system. We have two smaller standpipes, filled by a booster station, that supply limited high-service areas.

Filter Plant

The filter plant consists of eight filters, each 1¼-mgd rated capacity. The settling tank was designed to supply three hours detention, and the mixing chamber supplies a 20-minute mix with over-and-under baffles. Our standard application of alum is at the rate of approximately 0.6 grains per gallon. We now have plans in progress that will boost the filter plant capacity by 20 mgd. We expect to have the plant built within the next two or three years.

Water from the filter plant discharges into the Crystal Spring basin, where it is transferred to the mains by direct pumping.

It is in the two spring-fed basins that we get into our difficulty with algae. The basins are relatively large, and the flow through them is quick. Thus, it is not practical to cover them, nor can we use copper sulphate effectively because of the short detention period. We also are hampered in the use of activated carbon because the spring water is not filtered. Consequently, there is no practical way to remove the carbon after it has done its job. Thus, from the earliest days of chlorination, going back to the time when we applied chlorinated lime from second-hand vinegar barrels, we have had intermittent complaints about taste originating from the action of chlorine or chloramines on the algae growth.

Where First Tried

Our first experiment with breakpoint chlorination was confined to the filter plant, starting the treatment about one year ago last April, discontinuing ammonia treatment at the same time. This did not completely do away with complaints about taste in the water; in May we discontinued chloramine treatment at the pumping station and increased the chlorine dose to effect breakpoint chlorination just before the mixed waters were pumped into the system. This produced a decided improvement in the taste but at the same time introduced a new, very slight odor which was identified as nitrogen trichloride.

To overcome this, we moved the application point of chlorine from the pump suction chamber to the mouth of Crystal Spring, a distance of approximately 180 feet, hoping that any odors might be reduced in the extra distance that the water had to travel before being pumped into the mains. This new chlorinating point made it necessary to increase the chlorine dosage to about twice the previous amount in order to maintain the proper residual in the distribution system.

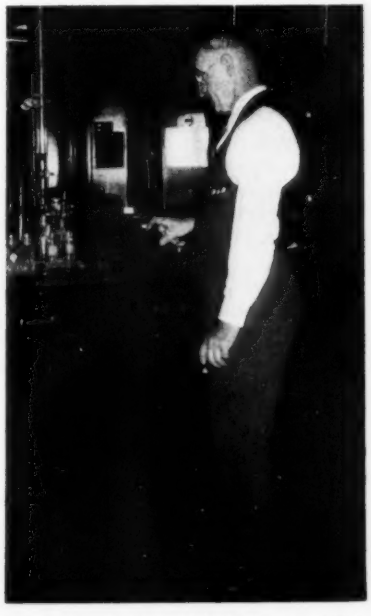
The change produced some improvement but did not eliminate the odor completely, so we placed a perforated brass pipe into the entrance of the pump suction channel and with available air compressors aerated the water. Relocating the point of application of chlorine has, among other things, resulted in a deadly effect on algae in this basin.

This aeration has helped somewhat but has not completely removed the final trace of odor. It is possible that we will have to go to greater air-compressor capacity before rendering a final decision on the efficiency of aeration for this particular problem.

Dosage Required

We found by experiment that to secure the breakpoint of the normal river water, 1.6 ppm of chlorine would have to be applied. A change in the river turbidity caused by rain naturally required more chlorine. At the filter plant we find that by applying sufficient chlorine to produce

Below: Shantz's Spring forms the third point of supply. Note the small chlorine house. The darker portions of the water indicate the presence of algae and show how the chlorine application is gradually clearing the reservoir. City Chemist Harry Krum (right) demonstrates how he uses the Klett-Summerson photoelectric meter for hairline accuracy in determining chlorine residuals.



1.6 ppm of free chlorine residual, breakpoint is complete. At the main pumping station, or secondary chlorinating point, we found that by adding an amount of chlorine which produced a residual chlorine of from 0.5 ppm to 0.6 ppm free chlorine, breakpoint was complete, and we could find free-chlorine residual in all but the dead ends of the system.

The higher dose of chlorine at the filter plant had no appreciable effect on alum floc formation. The low amounts of iron and manganese in our water did not produce any noticeable reactions with higher chlorine doses.

We can best show the benefits of this type of chlorination by the following table:

	Before	After
Number of samples	525	525
Number of fermentation tubes	2,625	2,625
Samples showing 48-hour gas, no confirmation	515	25
Tubes showing 48-hour gas, no confirmation	1,190	106
Samples confirming B. coli	2	2
Tubes confirming B. coli	6	6
Pounds chlorine per mg	4.16	8.17
Cost per mg of chlorine	30c	59c

By doubling the amount of chlorine applied to the Allentown water, we have been able to produce breakpoint chlorination. We also have been able to produce a free chlorine residual in all but the dead ends of the system.

The taste difficulties by this treatment have been greatly reduced, but a nitrogen-trichloride odor is present at times. We may be able to eliminate this by use of greater aeration of the water in the pump-suction channel and also by destruction of algae in the Crystal Spring basin—something that gradually is taking place since higher doses of chlorine are maintained in the basin.

State-Aided Public Housing Harmonizes with Local Patterns

By HERMAN T. STICHMAN
Commissioner of Housing
State of New York

A WORKING partnership in building homes for low-income families of New York State has been carried on successfully over the past years by the New York State Division of Housing and local housing authorities and officials under terms of the $300,000,000 state-aided public housing and slum clearance program. In practice, this has meant planning and designing such housing so that it will harmonize with, and often enhance, the local land and architectural patterns.

No Massive Apartments

The design of every state-aided public housing project originates with local architects retained by the municipal housing authority. The introduction of public housing in communities outside of New York City has brought no massive structures crowding out the friendly atmosphere of neighborly living, but instead garden-type residential developments.

Proof of the harmonizing effect of public housing in a community is found in the state-aided low-rent permanent housing projects already built and occupied in upstate communities. These projects are in North Tonawanda, Tonawanda, Schenectady, Niagara Falls, Elmira, and Utica. In these communities most houses are one, two, or three stories high. The multiple dwellings erected by the state have fitted into this community architectural pattern with two-story buildings in every locality. The state-aided housing project in Utica has both two- and three-story structures.

Since grass and flowers are an integral part of homes in upstate communities, state housing projects are designed in every case to include lawns and garden space. The buildings usually occupy no more than 20% of the site. In addition, recreational facilities are an integral part of each project. The public housing developments, their parks and playgrounds, benefit the entire community, forming the initial basis of neighborhood improvement and contributing to the health and safety of the entire population.

Center Court, Niagara Falls, a New York state-aided low-rent housing development which shows the typical architecture for upstate residential communities.

Dayton Adds Digesters

An Imhoff tank treatment plant gets more digestion-tank capacity to help it handle a flow 50% over design capacity.

FOUR new digesters coupled with six now in use give a battery of ten that condition the sludge from the Dayton, Ohio, sewage treatment plant. They allow an Imhoff plant designed for a flow of 25 mgd to handle and treat successfully approximately 35 mg of sewage daily. The digesters condition the sludge prior to its ultimate drying in a Nichols Multiple Hearth incinerator, after which it is processed for sale as fertilizer.

The latest improvement constitutes another step forward in the improvement of the plant—improvements, incidentally, which were brought about, not by the bludgeoning action of the state board of health, but because the city recognized of its own volition the desirability of better treatment. One step was that of installing rotary trickling filters in 1936. Another was the construction of the first set of digesters to relieve inadequacies in the Imhoff tank design in 1938. Still another was the adoption of sludge processing to make a final sanitary disposal of the sewage solids and at the same time to produce a certain amount of income for the city.

From 1931 to 1946, inclusive, 18,307.8 tons were processed and sold for an accumulated profit of $23,943.96. The profit is figured on operation and maintenance costs. During 1937, 2,142 tons were sold; this has been the most productive year as far as tonnage is concerned.

The treatment plant receives sewage from two pumping stations. The main source is known as the South Broadway pumping station, having five Worthington centrifugal pumps, driven by General Electric synchronous motors, with a total capacity of 72 mgd. This station feeds a 54-inch precast concrete pipe force main which is 5,385 feet long and discharges into the detritus tanks at the treatment plant.

The Westwood Pumping station is located on the plant grounds, handling about 2.25 mgd and discharging into the same force main. The continued average daily flow for 1947 through May 31, 1947, was 41.0 mg and was considered a strong domestic sewage with an occasional shot of troublesome industrial waste.

1. (Upper left) This pair of detritus tanks removes both grit and screenings. 2. A battery of trickling filters provides the secondary treatment. 3. A Link-Belt screen- and bucket-elevator washes the grit and removes it for disposal. 4. Supt. Huffman examines one of the floating covers on the new digesters. 5. Rocks mortared into this effluent flume provide a final bit of aeration for the effluent. 6. Here is the Dayton incinerator, where the sludge is conditioned for use as a fertilizer.

The sewage in passing through the detritus tanks leaves a residue of heavy solids which are pumped into grit channels equipped with Link-Belt grit removal mechanisms and through Dorr fine screens. All grit is dumped while skimmings and screenings are burned at the garbage incinerators. The effluent from this operation joins the main flow from the detritus tanks and

passes through the battery of six Imhoff tanks. Each Imhoff tank is 88 feet long, 73.75 feet wide, and 30.5 feet deep. The tanks remove roughly 60% of the suspended solids and 30% of the BOD. Scum and some sludge from the Imhoff tanks averaging 21,000 pounds of dry volatile solids per day are fed to the separate sludge digestion tanks with their 240,000 cubic feet of digester capacity.

The Imhoff effluent travels on to the trickling filters equipped with PFT filter mechanisms and dosing tanks. There are twenty of these, each 165 feet in diameter and having 7½ feet of slag as a filter medium. The applied BOD in 1946 was 474 pounds per acre foot.

The filter effluent travels to the six final settling tanks, each 80 feet in diameter with a 9-foot sidewall depth and having Link-Belt clarifying equipment. The humus from the final tanks is pumped back to the head of the plant; the final effluent, carrying an average of 36 ppm of suspended solids and 27 ppm of BOD, travels 2,000 feet in a paved ditch and empties into the Great Miami River.

Despite the use of the digesters, however, it became apparent that even more digestion capacity was required. Consequently, four new units were planned to give the plant from 3 to 4 cubic feet of digester capacity per capita, based on equivalent population loading. The new digesters are 85 feet in diameter, with a 30-foot sidewall depth and a 1:7 bottom slope.

The new digesters will utilize the recently developed PFT heat exchanger to bring the sludge to proper digestion temperature, rather than coils in the tanks. Each exchanger has a capacity of 500,000 BTU's per hour. At present, the plant has two exchangers. Particular attention was given to the piping arrangement to insure complete flexibility in handling the incoming sludge as well as the sludge within the tanks. Digester gas will be used as fuel for the heat exchangers in maintaining the optimum sludge temperatures. Our present supply of gas, 250,000 cu. ft. per day, will be sufficient for all operations.

Sludge from the tanks is drained on glass-covered drying beds and then finally dried in a Nichols-Herrshoff multiple hearth furnace. The sludge so treated is ground and screened to keep its maximum size below ¼ inch, and then it is sold for an average price of $11.25 per ton when bagged, or for $8.25 per ton in bulk. Approximately 50% of the sludge is processed in this way. Much of it goes to Florida fruit growers.

The fertilizer operation is conducted along with garbage incineration, with the multiple hearth incinerator being housed in the same building as the Monohearth units. These units, incidentally, represent a remodeling of an old DeCarie-type basket incinerator in which three of the self-stoking cones replaced the old hand-stoked baskets. The change has made labor conditions much better due to the easier work. The incinerator maintains a temperature of 1,400° F. in the combustion chamber and records this on a Brown pyrometer.

The original garbage incinerator was designed to handle 150 tons of mixed refuse composed of 65% garbage and 35% burnable material, with a moisture content not to exceed 55% in twenty-four hours. This was the DeCarie Basket Grate. During the latter part of 1945, the furnace was reworked, the basket grates removed, and the Monohearth semi-automatic stoking cones installed.

This new equipment has increased the capacity of the furnace approximately 15% and made operating conditions much more pleasant.

The Dayton plant is somewhat unique in that operated with it is a 160-acre farm on which Superintendent Huffman can experiment with sludge for fertilizer. Certain portions of the farm have been conditioned with semi-dry sludge to observe the difference that alfalfas and certain grain crop undergo in growing. The difference, he reports, is striking both in the size and quality of the crop. To further increase the farm's productivity, thought is being given to utilizing the sewage effluent by irrigation to take advantage of the many dissolved solids of fertilizing value that are now flushed down the stream.

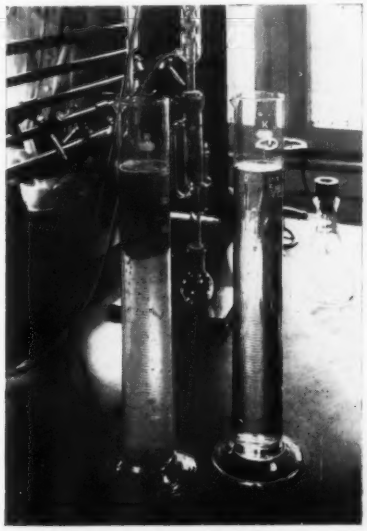
When the plant was originally erected, City Manager Fred O. Eichelberger arranged for Dayton to purchase 640 acres of land at the city's outskirts. On this the plant was located, and, subsequently, the adjoining farm. With the balance, he built the city's popular Madden golf course, making this sanitation improvement not only one that prevents Dayton from being a health menace and a nuisance to her downstream neighbors, but also helps provide pleasure and recreation.

"Our City"— Indianapolis' Post-War Plans

AFTER more than two years of intensive study of the needs and requirements of the city of Indianapolis, Ind., the Indianapolis Post-War Planning Committee has published a 45-page booklet presenting the general aims and a schedule of priority in the completion of post-war plans.

A complete overhaul of the sewer system is listed as the most urgent need. An estimated 5½ million dollars, the booklet states, must be spent in the next seven years to clean, rebuild, and extend the system.

At present, houses and business buildings are flooded after every rain, says the report. Many of the sewers have not been cleaned for years. And many of the suburban areas must depend on individual septic tank disposal, resulting in raw sewage floating out of overflow pools into public streams when small streams and rivers reach flood stage.



Raw sewage dumped into streams . . . yields polluted, filth-laden water.

The Tarrytowns Unite for U.N.

Villages of Tarrytown and North Tarrytown selected as a "pilot" community for the nation-wide United Nations Week, September 14-20, 1947.

By STERLING W. FISHER, *Mayor*
Tarrytown, N. Y.

CAN American communities harness as much power for peace as they harnessed for war? Upon the answer to that question may depend the future of American democracy, possibly even the fate of the world, for decades. How can the answer be obtained? Only by selecting a suitable community for a "pilot" experiment and by taking the largest possible "target" for that experiment.

The pilot community selected is that of the Tarrytowns (Tarrytown and North Tarrytown), and the target picked is support for the United Nations. The reason for selection of this target hardly needs explanation, since the UN is admittedly the only existing organization offering any framework for the construction of lasting peace. But how and why the Tarrytowns as the pilot, or "model" community? And what is this "pilot" community doing in preparation for United Nations Week, September 14-20?

To answer the former question first: The Tarrytown community was not selected because it is a "model" in the sense of having wider and better streets, finer stores, or better municipal government or citizenry than any other community. It was chosen, rather, because it was unusually well circumstanced and situated to be developed into a "model" of community activity in a great cause. Here, then, were some of the reasons:

First: The national and international observance of United Nations Week was originated and is sponsored by the National Broadcasting Company and the American Association for the United Nations, both having their headquarters in New York City. This fact, plus the nearness of the United Nations Headquarters itself, made it imperative that the "model community" be within easy reach for officials of the UN NBC, and the AAUN.

Second: The Tarrytowns are a "cross-section" community in an unusual sense, numbering among their 18,000 residents large segments of every trade and of scores of national groups. The villages actually have more than twenty-five nationality-group organizations, which keep alive their own folkways, folk dancing, and music.

Third: The Tarrytowns are the center of great historical and literary tradition. Within their borders are such shrines as the Old Dutch Church of Sleepy Hollow; Sunnyside, the home of Washington Irving; the famous Philipse Castle, dating from 1687 and now being restored by John D. Rockefeller, Jr.; the monument on the site where, during the American Revolution, three patriots captured Major John Andre, British spy and Adjutant General of the British Army, as he was attempting to reach British lines with the plans of West Point.

Fourth: The recent municipal elections had aroused an unusual degree of community interest and created great concern over cooperation and unity. In both villages, the tickets swept into office had been openly or tacitly committed to seek unification of the villages, to eliminate competition, friction, and waste. This effort to get together, it was felt, would be symbolic of the necessity for unity and cooperation on the world stage, and the interest generated could be harnessed to the U. N. observances.

Fifth: The present writer, as a Co-Director of International United Nations Week and Director of United Nations Affairs for NBC, was in a position to assure the closest coordination of the Tarrytown model experiment with the national and international observances.

Now to answer the question about what the Tarrytowns are doing. The two Mayors appointed as General Chairman for United Nations Week Sylvester J. Balassi, Vice-president of the Washington Irving Trust Company, who had been brilliantly successful in the two communities in conducting wartime campaigns. Mr. Balassi immediately began the organization of special committees to cover every major phase of community life and to prepare special programs and activities for United Nations Week. The aim was to bring into the committees and their activities as many hundreds and thousands of the citizens as were interested in the project.

Illustrative of the speed of the development was a meeting of committee chairmen held at the Warner Library only two weeks after the General Chairman was appointed. At this meeting, attended by nearly 200 active citizens, a remark was perhaps truly made that by September 14 almost every adult of the two villages would be a member of some United Nations Week committee.

The plans were then drawn up, under Mr. Balassi's leadership, along the lines laid down in a memorandum* prepared by the AAUN as a guide for community activity. This offers detailed suggestions for group cooperation by:

1. Churches
2. Schools
3. Retail stores
4. Business firms (banks, public utilities, etc.)
5. Women's clubs
6. Labor unions
7. Service clubs (Lions, Kiwanis, Rotary, etc.)
8. Professional groups (physicians, lawyers, etc.)
9. Community officials
10. Young people's groups
11. Press and radio
12. Libraries
13. Nationality groups

Further to stimulate community interest, a dinner and public meeting were organized. As a sample of what United Nations Week would mean, the Tarrytowns invited to the meeting as speakers such persons as Andrew Cordier, Executive Assistant to the Secretary General of the United Nations; Benjamin A. Cohen, Assistant-Secretary General of UN; James T. Shotwell, Director of the Carnegie Endowment for International Peace and James Rowland Angell, Public Service Counselor of the National Broadcasting Company. Sets of United Nations flags were borrowed for decoration and considerable showmanship was resorted to so the citizens would appreciate the job before them.

Plans for the week itself include invitations to such world leaders as Secretary of State George C. Marshall and Secretary of Commerce W. Averill Harriman. Trygve Lie, Secretary General of the United Nations, and Paul Henri Spaak, President of the UN Assembly, to speak in the Tarrytowns.

More than twenty broadcasts, several of them nation-wide, will be put on the air through NBC facilities. Station WNBC has announced its intention to devote the entire day of Friday, September 19, to its "Salute to the Tarrytowns," originating from the community fourteen or fifteen broadcasts with nearly all its major stars participating.

The entire story is too large to be told in a brief article. It is sufficient to say at this stage, however, that it seems certain that neither in war nor in peace has any community ever before devoted such widespread and intensive effort to any single enterprise.

* Mimeographed copies are available on application to the American Association for the United Nations, 45 East 65th Street, New York 21, N. Y. Ask for memorandum entitled "United Nations Week: The Tarrytown Plan."

"You're Going to Have Your Picture Taken"

How Milwaukee organized, publicized, and utilized the most intensive chest x-ray survey ever held in an American city.

By E. R. KRUMBIEGEL, M. D.
Commissioner of Health, Milwaukee, Wis.

MINNEAPOLIS CHEST X-RAY
NEWS
CITY SETS HEALTH PACE
TB Eradication In Minneapolis Is Goal of X-Ray
Minneapolis Is First Big City To Ray Everyone
Cancer Must Be Detected Early
Tb Is Curable If Caught Early
EVERYBODY'S DOIN' IT!
YOU'RE GOING TO HAVE YOUR PICTURE TAKEN
LET X-RAY SAY Okay!
WE ARE COOPERATING— ARE YOU?
COMING TO YOUR NEIGHBORHOOD
FREE
CHEST X-RAY
for everybody
LET X-RAY SAY Okay!

Education and publicity are an important phase of the x-ray survey. The booklet directly below was distributed by the Milwaukee Health Department; the rest of the literature illustrated is being used in the Minneapolis survey, which will run through August 20.

DRESS rehearsal for a "revolution in public health technique" recently was staged in the city of Milwaukee, when the Health Department, in cooperation with the U. S. Public Health Service and the Wisconsin Anti-Tuberculosis Association, conducted the most intensive chest x-ray survey ever held in an American city.

This is no idle claim, for it is a fact that a community-wide program in a city the size of Milwaukee (624,000 population) has never before been attempted. Started officially on February 3, the survey was originally scheduled to run for ten weeks, but the extraordinary snows of mid-February and March, plus the unexpectedly enthusiastic response of the people, resulted in its extension for one and one-half weeks.

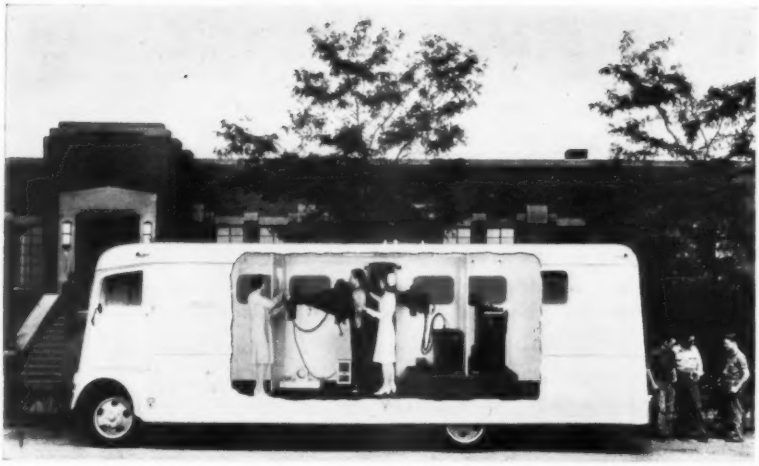
When it was finished, some 182,004 persons had been x-rayed with miniature 70-mm. roll film. Of this number 2,799 cases of "significant tuberculosis" were discovered, not to mention 1,515 cases of non-tuberculosis chest disease.

On a percentage basis, this means that 1.54% (slightly more than the national average) of those x-rayed showed signs of "significant tuberculosis," and that the incidence of other disorders was 0.83 per cent. The investment in dollars was small considering that a high proportion of these diseases was communicable; early apprehension saved countless thousands of dollars in hospitalization, medical care, and public health funds. Some 600 cases of TB are ordinarily reported in the city of Milwaukee annually, and over 200 fatalities are attributed to this disease each year. Hospitalization at Muirdale Sanatorium costs the taxpayer about $1,800 per patient per year. Considering that usually there are, on an average, 458 TB cases at Muirdale per year, prevention through case-finding and isolation of carriers would cut the tax load tremendously. Add to this the decreased public relief rolls and the increased industrial production. It is like sowing an acorn and reaping an oak tree.

Theory of the Mass Survey

At the outset, a discussion of the theory behind the x-ray survey should be presented. Medicine has stressed *treatment* of the already-diseased, while public health has stressed *prevention* through inoculation and the control of strategic supplies. With the survey idea, a third element enters—*case-finding*. Case-finding as a method is not new, since the idea of the tuberculin skin tests has been employed in schools for many years; but the idea of applying case-finding to entire populations and of using a medium such as x-ray, which is a catch-all for many types of diseases and is more revealing than the skin test, is a distinct contribution to the progress of public health.

Case-finding is the third prong of the pitchfork with which we are tossing disease out the window. It lies between the extremes of cure and prevention, and is as necessary as both these methods. It is particularly well-adapted to that type of disease which comes by stealth and grows to alarming proportions before the victim even knows there is anything wrong with him. In this class, tuberculosis is a prime example, as are also cancer and heart disease. For example, in our survey, we found



COURTESY GENERAL ELECTRIC X-RAY CORPORATION

Cutaway view of the General Electric x-ray bus.

one case in which the heart was so enlarged as to fill the entire chest area and press against the left chest wall without the victim's knowing of this condition. In another instance, a cancerous mass was detected which would probably have begun to metastasize within a matter of months, making the task of surgical or radiation treatment infinitely more difficult.

The advent of miniature x-ray film, which has cut film costs some 90%, has made mass surveys economically feasible. In addition, it was found that 70-mm roll film not only cut costs but also speeded operations, since the camera advances one frame automatically with each exposure, and entire rolls can be developed at one time. The need for one technician to change film plates is eliminated. Use of a photo-timer makes chest measurements unnecessary. It is even possible now to eliminate removal of shirts and blouses, which not only consumed time, but also was a mental hazard for many people and kept them from participating in the survey.

For the task accomplished in Milwaukee, eight modern chest x-ray units were needed, including three bus-type mobile units, two of them furnished by the U. S. Public Health Service and one by the Milwaukee Health Department. The stationary units, like the buses, were moved to different locations every few days to give everyone in the city an opportunity to obtain a chest x-ray within a reasonable distance of his place of work, residence, shopping, or study.

It is an interesting commentary that in Milwaukee in 1941, just before x-raying of any sort was offered to the public through the Health Department, only 15% of active TB cases reported were in their early stages; by 1945, this had risen to 26 per cent. When x-rays were taken of all those entering the armed forces, 55% of cases found were early. In surveys made with bus units in industrial plants, 63% of the cases were early. In our community survey a very high percentage were early. Needless to say, this is a tremendous achievement in itself. It shows that we are tracking down the beast in its lair.

Education through Publicity

Newspaper publicity was begun far in advance, to start everyone thinking about the survey. A booklet was issued, entitled "You're Going to Have Your Picture Taken", with 100,000 copies distributed to homes by Health Department nurses. This explained such basic questions as who will be x-rayed and where, how much it will cost, whether it will hurt, how long it will take, whether one has to undress, whether the examinee will receive a report, and when he can be x-rayed.

Also distributed were 100,000 copies of store-bundle and payroll-envelope stuffers, featuring the slogans: "Healthy Looks can Hide TB. Take advantage of the city-wide program February 3 to April 11. *Free Chest X-rays for Everybody.* No fuss, no undressing, reports confidential. Watch your newspaper for the x-ray station most convenient for you."

After each person was x-rayed, he was handed a leaflet saying: "Congratulations! You have done a sensible thing. If the x-ray shows your lungs are clear, you will have added peace of mind. If it reveals a suspicious shadow and further study shows you have TB, you can secure proper treatment immediately and thus speed your recovery. You have done a public-spirited thing—you have taken a patriotic part in putting over one of the most inclusive TB case-finding programs ever attempted in a city of Milwaukee's size. You have done your friends and neighbors a good service, for no home is safe from TB until all homes are made safe. In the meantime, urge your friends to be examined."

Census-Like Studies

A major feature of the campaign was the census-like study conducted at the request of the U. S. Public Health Service, using three areas whose TB death rate varies from the lowest to the highest. This was a door-to-door survey to obtain facts needed for a thorough statistical report on just how effective a survey such as ours will be in reducing the TB death rate, and how effective a door-to-door visit is in bringing people out for an x-ray. The census form, on mimeographed sheets, contains questions about "previous x-rays taken," "date of last chest x-ray," and "where taken." This part of the survey also proposed to determine the proportion of various age-groups in the population covered, and also to obtain lists of those who can be expected to come in for examination.

The three areas covered 101,514 persons in 29,929 dwelling units on 604 square blocks, and they were fairly evenly divided into persons, units, and blocks.

Augmenting the door-to-door survey were Health Department sanitary inspectors who distributed leaflets to each dwelling unit in the three districts. On the day each group of homes was covered, the mobile buses were at street intersections within two blocks of the dwelling units in that group. The leaflets were entitled: "So, you think you know the answers, do you?" Then followed a series of questions with multiple-choice answers. For example: "TB begins with blood spitting, with a cold and cough, without symptoms)? Answer. Without symptoms."

The Health Department even provided its workers with forms on which they could send in suggestions for human interest stories and newspaper photos. These ideas were then relayed to the papers by the department, and resulted in excellent photographs and stories.

For teachers, we distributed a booklet, "Let Us Look At Facts," and "The Educator in the Fight Against TB." These were part of a kit given all survey workers that also included all the leaflets, a TB true-false test, a program fact sheet, and a list of promotional material available. The latter involved not only pamphlets, but also posters, movies, filmstrips, packets of literature, and the speakers' bureau.

The speaker's bureau was one of our most ambitious projects, and it paid

dividends. The list of speakers and their itinerary in promoting the survey is indeed impressive. On January 27, for example, we sponsored talks by prominent persons at four organizations — Lions Club, Girl Scouts, the Rotary Club, and Milwaukee Woman's Club. We also had several speakers on every other day of the month, throughout February and March. The newspapers ran the speaker's daily schedule.

Then there were spot announcements written for radio presentation and furnished to the local stations. These required only a moment, but their very brevity made them impressive and outstanding.

Active Participation Won

Also of value to teachers was a mimeographed outline sent them on "What the Elementary (also junior and senior high) Schools Can Do in Promoting the Mass X-Ray Program."

We launched the entire TB survey program by inviting the directors of all health, welfare, and allied agencies to attend a combined meeting in the city council chambers. Included were civic, labor, education, hospital, nursing, veterans, and business organization leaders. The program was outlined to them, their assistance solicited, and their advice asked. We stressed: (1) That every new case was acquired from someone with active TB, (2) that all abnormal findings are reported to the individual in a sealed envelope, and (3) that the program would more than pay for itself through decreased public relief rolls and sanatorium care and increased industrial production. Opposition was negligible. Apathy was converted into active participation.

As if all this were not enough, the schools co-operated intensively by making the x-ray survey part of almost every course: Themes for English classes, x-radiation studies in physics classes, etc.

The x-ray buses presented somewhat of a problem in electricity, but this was easily solved by requesting the Milwaukee Electric Co. to assume responsibility for connecting them to nearby power lines so that operations could begin promptly each morning at new locations. To service all x-ray units there was provided a half-ton panel truck containing electrical supplies and repairs. A Federal Service Administrative Officer was supplied, with station wagon, to respond quickly to emergency calls and to expedite service to all operating units.

The eight x-ray units combined have taken as many as 5,618 radiographs a day! At this rate, many communities throughout the country could be completely x-rayed in a few days' time. We do not aim at 100% coverage since lung-destroying TB in persons under fifteen years is not often found, and we permitted x-ray of children under the age of fifteen only when accompanied by parents. This further reduces the task, bringing the goal of complete effective coverage a step closer.

For an Effective Follow-up

Anticipating the huge case load that would be uncovered through the survey, the department and the state TB association began a publicity drive designed to promote the idea of compulsory hospitalization for those found to have active TB. The drive awakened the county to the need for more effective legislation and for more facilities. Newspaper editorials called for: (1) more sanatorium beds, (2) central registry of all cases, (3) compulsory legislation and (4) better state aid to families of hospitalized wage-earners.

The Medical Society of Milwaukee County was moved to adopt an eleven-point program, which included the enlargement of the county sanatorium; establishment of a boarding home for discharged patients still in need of rehabilitation; central county TB control agency; compulsory isolation of TB cases considered a menace; x-ray examination of chests of all TB contacts; routine chest x-rays of all hospital admissions, and centers for periodical miniature x-rays of everybody in the county.

A thirteen-room, $12,000 chest clinic was opened by the Health Department at South View Hospital but it functions separately from the hospital, replacing a smaller center. Clinic hours were announced by the newspapers. Suspicious cases were given life-size "14 by 17" radiographs and their cases processed.

If Other Cities Wish to Act

We hope that our experience has opened the door to the extension of case-finding on a national scale. In such a campaign, cities and their health departments will play a central role, aided by the state health departments, the U. S. Public Health Service, and state and local tuberculosis associations. USPHS' contribution consists in supplying some of the bus-mounted and stationary x-ray equipment and technical direction. The city contributes personnel, follow-up facilities, and knowledge of local conditions. The tuberculosis association provides educational materials and survey personnel. From Milwaukee, the USPHS buses and technical workers have proceeded to Minneapolis for a similar survey. Chicago has asked USPHS to plan a community-wide survey of that city early in 1948.

COURTESY GENERAL ELECTRIC X-RAY CORPORATION AND U. S. PUBLIC HEALTH SERVICE

The patient is fully clothed when the x-ray is taken. The nurse stays behind a protective lead shield. Right: The developed films are examined by a competent physician (this one is from U. S. Public Health Service).

Teaneck, N. J., Builds
Permanent Veterans' Housing Project

Despite opposition, work is speeded on well-designed apartments to remain an asset to the community under a program using state funds.

TEANECK, N. J., a township of 30,000, is the first community in the state to have broken ground on a permanent housing project for veterans under a plan made possible by the allocation of $41,000,000 in state funds to municipalities for veterans' housing.

Under the Teaneck program for using the state funds, nearly double the number of veterans will be furnished accommodations than would have been possible if temporary "emergency" units were erected. The veterans will be housed in spacious, well-designed, comfortable apartments which will remain a permanent asset to the community. Instead of sustaining almost a total loss on the venture, as with temporary housing, the State of New Jersey will get back most of the funds made available to the municipality at the end of the five-year emergency period set by law. The permanent seventy-two-family project will cost only a little more per unit than the fifty temporary veterans' housing barracks previously erected in Teaneck under the federal program.

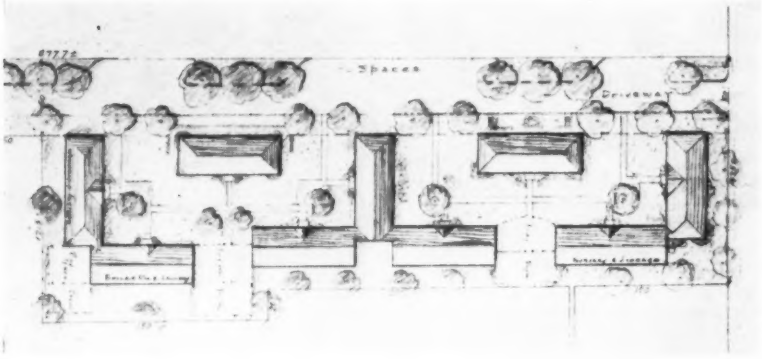
Interest High in Project

Interest in the success of Teaneck's venture is evidenced among other communities in the state, and it is possible that many of them will undertake permanent projects for veterans on a similar basis. Construction is proceeding, with the work to be finished within a 200-day period, and the project will be ready for occupancy by Thanksgiving day. Rentals to the veterans for the 4½- and 5-room apartments will be from $45 to $50 per month, not much more than half the rentals for similar accommodations in private developments.

Many obstacles were encountered before the Teaneck program could proceed, not the least of which was the opposition of local and state real estate interests to any plan for permanent municipal housing for veterans. The State Department of Economic Development, under whose direction the disposition of the state funds was placed, had decided after a hearing in January that any municipality, if it so elected, could use its allotment of funds for permanent housing. Officials of Passaic and Paterson were among the original chief proponents of such a program, and they were supported by representatives of all major veterans' organizations.

State Aid Formula

Under the New Jersey legislation, a formula provides $10 per capita to each municipality for veterans' housing. State funds are available either in cash, if the municipality decides to proceed entirely on its own under state regulation in the letting of public bids, etc., or in its equivalent in housing units supplied by the state, if the municipality so desires. The state grant is used only for the construction of the housing unit, with the costs of the land, preparation of the site, installation of streets, approach walks, and utilities borne by the municipality. At the expiration of the five-year emergency period, temporary structures will be removed by



Above. A plot plan of the garden apartments for veterans of Teaneck. Right: A sketch of one of the buildings.

the state at the request of the municipality; permanent units will be sold and the proceeds divided between the state and the municipality in proportion to the investment of each. State aid for permanent housing is limited to $5,600 per unit; if per-unit costs are higher, municipalities make up the difference.

Before the last state legislative session was adjourned, laws were also enacted making it possible for municipalities to borrow mortgage money, for use in the construction of permanent housing for veterans, to supplement the state's funds. Teaneck, which had at an early date developed preliminary plans for permanent apartments for veterans housing under the direction of George M. Cady, Superintendent of Building, was approved as a mortgagor.

A commitment from an insurance company for a $300,000 mortgage on the proposed project was secured without difficulty, but at this point, the New Jersey Association of Real Estate Boards threatened suit against the State on the grounds that this type of permanent housing was unconstitutional. Because of the suit, the Teaneck mortgage offer was withdrawn, and it seemed as if the whole project would be abandoned.

Bond Issue Authorized

Teaneck officials announced, however, that they were "far from licked," and that they would not leave "a single stone unturned" in their efforts to provide veterans' housing. With local veterans' groups mobilizing full support, the Teaneck Township Council approved an emergency resolution to make possible an appropriation of $300,000 to provide housing and authorizing the issuance of bonds or notes in that amount to finance a permanent project.

This $300,000 is considered by the State as "first mortgage money," and will be repaid to Teaneck in full out of the proceeds of the sale. The additional $30,000 supplied by Teaneck for the site and public utilities will be repaid from any monies received for the project above the $300,000, which will be allocated proportionally between the state and the township in relation to the costs to each for the project.

Since that step, several other private companies have indicated strong interest in obtaining a mortgage on the project despite the realtors' suit against the state, and Township Manager Paul A. Volcker has stated that the resolution will be cancelled if the Township decides to take such a private mortgage. The interest rate for a bond issue would not exceed 2% as against an estimated 4% for a private mortgage. The choice is not such a clear-cut one, however, because, under New Jersey law, if the bonds are sold, some amortization will have to take place over the five-year period. Under a mortgaging scheme, only the interest rate will have to be paid, and rents to the veterans, until the project is sold and disposed of, can remain lower.

Representatives of veterans' groups selected the project site from among the areas owned and acquired by the Township over a period of years as part of a planned program of community development. The project will contain community nurseries, laundries, and play space for children, as well as larger rooms and units than the average private development. Considerable construction savings will be made through the use of uniform material and lumber sizes and arrangements.

A special community committee, consisting of a doctor, Red Cross representative, minister, journalist, and banker, is conducting a screening process to select those veterans to be given preference for admittance to the project. The Teaneck Welfare Department will classify the cases and make reports available, but the committee knows each case only by number, not by name.

Good Words for Dayton's City-Manager Government

IN one of a series of reports on the government of the city of Dayton, Ohio, made recently by Griffenhagen & Associates, Consultants in Public Administration and Finance some unusual statements were made about the quality of the administration under which the city government has been operating. These statements were contained in paragraphs quoted as follows:

Most of the earlier reports of this series have laid emphasis upon flaws in the policies, organization, procedures, or operations of various departments, divisions, and bureaus of the city government. This was done, not with the purpose of finding fault, because our assignment was to report improvements that might be made and not to record conditions found to be satisfactory. It was obviously necessary to say wherein and why a certain state of affairs was not satisfactory before presenting a suggestion for the elimination of the defect.

The emphasis laid upon shortcomings could easily lead to the impression that there was little worthy of commendation in the operation of the city government. Such an impression would be entirely erroneous. The plan and the administration of the city government have much to commend them. A few of the major instances are mentioned in the paragraphs that follow.

The city has an honest administration. Not once in the course of the studies of the various departments has the staff encountered even the slightest indication to the contrary. Nor has there been even a whisper of a rumor of dishonesty, graft, or corrupt practice. This is a situation to which every citizen who takes an interest in his city government can point with pride.

The city has an economical administration. Such few opportunities for savings as have been pointed out in other reports of this series represent a very small fraction of the total expenditures. There has been no evidence of extravagance.

The officials of the city are conscientiously and unstintingly giving their best efforts to render the most effective municipal services to the citizens that the finances of the city will permit, if in any individual instances, the end product has fallen short of this goal, the cause cannot be traced to any lack of good intentions.

Few cities are as free of what is usually best understood under the label of "political pressure." To a marked degree, the administrative officials and employes are secure in the knowledge that they can do their work impartially without fear that their actions will be overruled for reasons of political expediency. There is no evidence of the pernicious practice, so common in many cities, of withholding enforcement of the law or ordinances until a check can be made to determine whether the violator is entitled to special consideration because of political affiliations.

The foregoing achievements have not come easiliy. The greatest weakness of democratic government lies in the difficulty it has in maintaining standards such as those just listed. Dayton has maintained them and has done so without sacrificing its responsiveness to popular opinion.

How a Small City Will Celebrate Its 150th Birthday

1797 Plan Now to Attend 1947

Philipsburg's One Hundred and Fiftieth

Birthday Party

JULY 20th TO 25th

PROGRAM

SUNDAY, JULY 20th—CHURCH DAY—
Worship at your own church with your old friends. Evening Worship in Stadium.

MONDAY, JULY 21st—ALL VETERANS' DAY—
Parades and Prizes by and for Veterans of all Wars.

TUESDAY, JULY 22nd—MINERS' and INDUSTRIAL DAY—
Gigantic Fireworks Display in Evening.

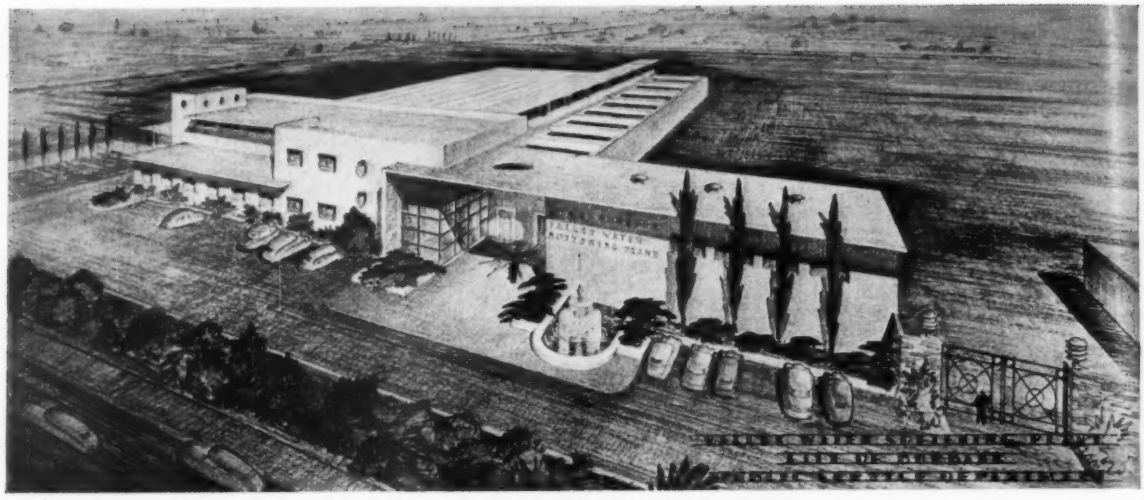
WEDNESDAY, JULY 23rd—FOUNDERS' DAY—
Historical Parade. Homecoming Celebration.

THURSDAY, JULY 24th—FIREMEN'S and SPORTS DAY—
Parades, Displays and Athletic Contests.

FRIDAY, JULY 25th—EDUCATIONAL DAY—
Class Reunions—Parade of School Children. Pageant at Stadium.
(All Parades at 5:30 P. M. Except Friday at 2:30)

DANCING EVERY NIGHT — EXHIBITS OF AUTHENTIC FURNITURE FROM 1797 TO PRESENT — SHOWINGS OF OLD GLASS, CHINA, COSTUMES—INDUSTRIAL DISPLAY.
PICNICS — BLOCK DANCING

JOIN OUR JUBILEE IN JULY
COME TO PHILIPSBURG, PA.



Burbank's future plans to improve water quality include the building of this softening plant.

Burbank's Water Developments

New wells and reservoir form latest stage in the program of this fast-growing city.

By JAMES C. McCAMBRIDGE,
General Manager
Public Service Department,
Burbank, Calif.

BURBANK, Calif., with its population of 515, was incorporated as a city of the sixth class in July 1911. Increasing dissatisfaction with the water service, supplied by a local company for domestic use and fire protection, culminated in March 1913 in a $50,000 bond issue for the establishment of a municipal water works. From such a humble beginning developed the Burbank water system, which today serves its 65,000 citizens and its many diversified industries through a system with a cost value of $3,380,297 against which there are outstanding bonds of $106,250.

Early growth of Burbank was rapid, but by 1920 the population was only 2,513 and largely devoted to agriculture. Burbank, located in the south end of the San Fernando Valley, offered unusual climatic change from Los Angeles, only ten miles distant, and, in the suburban movement of the twenties, made impressive population gains. In 1930, the population was 16,662, where it remained until late in 1936, when the aircraft industry in Burbank began its amazing development.

Production of aircraft on a wartime basis with three-shift operation was effectively under way in Burbank as early as 1939, with the Lockheed Aircraft Corporation supplying transports and bombers for the British and Dutch.

In 1940 and 1941, the system of subcontracting the manufacture of aircraft parts and auxiliaries to small independent plants was well established. These plants, ranging in size from the important Menasco Manufacturing Company down to small two-man job shops, have now successfully converted to peace-time industries. The highly diversified production by these manufacturing plants, together with the important Lockheed plants, Warner Brothers Studios, Walt Disney Studios, and Columbia Pictures, have now firmly molded the character of Burbank as an industrial-residential city.

The warm, semi-arid nature of Southern California, and the San Fernando Valley in particular, produces an unusually high per-capita water demand. During the transitional period from an agricultural community to a residential city, the average daily per-capita use was 150 gallons. Industrial water requirements have now boosted this figure to 200 gallons. A high ratio of peak-demand use to average use, in addition to this high average use, were responsible for the pattern of a liberal capacity water system.

Up to and including 1938, system expansion and improvements were made well in advance of system demands, and a large margin of reserves was carried in transmission mains and in water production facilities. With the advent of rapid industrial and residential development, installation of new facilities could not keep pace with new demands on the water system. For several years, the difference between new demands and new facilities was bridged at the expense of system reserves. When reserves were totally depleted, new plants and residential developments were supplied by specially installed facilities, the materials for which were obtained through the highest government priorities.

At the close of the war a comprehensive study of the water system was made so that system reserves could be reestablished and the system brought up to its high pre-war level of reliability. From this study, this (see box) list of projects was developed, completion of which is required to restore the system to proper operating condition.

A 40-acre tract was acquired by the city in 1940 for the new water-production, water-softening, and pumping plants.

Reservoirs

The most critical deficiency in the system was found to be that of reservoir capacity. With a storage capacity of

WATER BUREAU PROJECTS

Project	Estimated Cost
25,000,000-gallon reinforced concrete reservoir, and 4,000 feet of 30-inch transmission main	$ 825,000
Two 380,000-gallon reservoirs for No. 3 Pressure System	40,000
High-service booster pumping plant for No. 2 and No. 3 service areas	26,000
Additions to Valley Pumping Plant, including 2 new wells, 5,000,000-gallon forebay, and 25,000,000-gallon-per-day booster pumps	250,000
Replacement of undersized mains, including 105,000 feet of 2-inch standard steel screw pipe	320,000
Extensions to water transmission system	570,000
Water-softening and treatment plant	800,000
Total Water Bureau Projects	$2,831,000

only 9½ mg and experienced peak demands of 70 second-feet, total storage is equal to only a five-hour supply at peak demand rate. The system serves consumers located at an elevation of 500 feet to 1,400 feet, the 900-foot differential being handled by the employment of three separate pressure systems. The 9½-mg storage is comprised as follows:

System	Reservoir	Water Depth	Elevation, Full	Capacity in Gals.
No. 1	No. 1	20 Ft.	904 Ft.	6,900,000
No. 2	No. 2	20	985	2,200,000
No. 3	No. 3	13	1,154	348,000

Reservoir No. 3 has been augmented by the recently completed addition of a 380,000-gallon steel tank. Another 380,000-gallon tank will be constructed and tied into the other end of the No. 3 System during 1948.

Reservoir No. 1, placed in operation during 1928, serves the No. 1 Pressure System which covers 94% of the Burbank water system and includes all industrial consumers. Demands on the No. 1 System have increased to over 500% of the 1928 demands. In 1944, studies indicated that a 25,000,000-gallon reservoir was required to reestablish a sound operating ratio between demand and storage capacity. Design for the 25,000,000-gallon reservoir was made by the city's own engineering staff, the structural details checked and approved by Professor R. R. Martel of the California Institute of Technology, and the general plans and specifications checked and approved by the J. M. Montgomery Company, Consulting Engineers.

The site for the new reservoir was carefully selected so that overflow elevation would match that of Reservoir No. 1, with which it is to operate in parallel, and so that earth excavation and backfill quantities would be in approximate balance.

The structure will be of reinforced concrete, 440 feet by 320 feet, with a 25-foot depth at the sidewalls. Walls will be 24 inches thick at the base, sloping to 14-inch thickness at the top. The roof will be of 9-inch-thick concrete supported by 300 20-inch-diameter concrete columns spaced 20 feet apart. A roof-cover of 20 inches of earth will be used to reduce reservoir temperature.

A concrete center partition will divide the reservoir into two equal sections to permit cleaning and inspection of either half without interrupting service. An extensive subdrainage system is provided by means of a network of perforated pipes laid under the floor in porous concrete trenches. Eight independent drainage lines will extend from the reservoir to inspection boxes from which any subsurface water may be detected and its source determined.

With the 20-inch earth roof-cover previously referred to, there will be no outward evidence of a reservoir at this site when landscaping is completed. Special attention has been given to this feature as the area around the reservoir is a potentially high-grade residential district.

Progress has been more rapid than was anticipated, and it is believed that the reservoir may be put into operation well in advance of the scheduled completion date of December 1947.

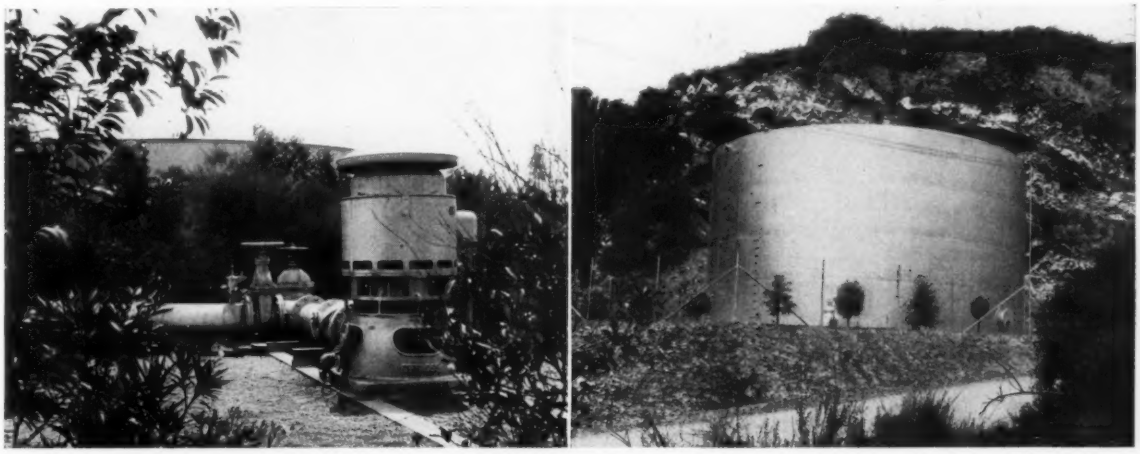
Water Production

The city's water supply is produced from wells sunk into the water-bearing gravels underlying the city, with a supplementary supply of Colorado River water filtered, treated, and delivered by the Metropolitan Water District. Production facilities consist of eight wells having an aggregate capacity of 14,380 gallons per minute. The wells vary in depth from 160 feet to 765 feet, with depths of the four major producing wells exceeding 600 feet. Static water level is approximately 30 feet below ground, with drawdown of 35 to 40 feet at full yield. The wells are equipped with turbine-type, multi-stage, electrically driven, deep-well pumps. Casings for the smaller wells are 12-inch and 16-inch, and on the four large wells, 20-inch. The safe continuous yield on the larger wells is 4 mgd each.

BURBANK'S DEEP WELL PUMPS

One Peerless	14-inch	3-stage
Two Wintroath	14-inch	multi-stage
One Pacific	16-inch	2-stage
One Wintroath	16-inch	4-stage
Two Peerless	18-inch	2-stage
One Wintroath	18-inch	3-stage

Deficiencies in water production are being overcome through the use of the Metropolitan Water District supply for meeting peak demands. The Metropolitan Water District line enters the city with a 50-inch-diameter feeder, reducing to 42-inch diameter at the Number 1 connection for the city's system. Two other connections are made with this feeder as it traverses the city. After leaving Burbank, this feeder connects with several other cities and terminates at the beach city of Santa



One of the 8 deep-well pumps and the 380,000-gallon standpipe which form part of the reserve storage system.

RELATION OF POPULATION AND INDUSTRIAL GROWTH TO TOTAL USE AND PER CAPITA USE

	Estimated average population during year	Number of meters	(1) Industrial use cu. ft. per year	(2) Total use sales per year	Industrial percentage of total use	Sale of industrial water per year in dollars	Total sales of water per year in dollars	Industrial percentage of total sales	Gallons daily use per capita
1946..	63,500	18,000	131,453,000	604,830,100	21.73%	90,002	647,936	13.89%	201
1945..	60,100	12,500	170,290,300	588,224,900	28.95	115,766	614,647	18.8	209
1944..	57,200	11,750	187,828,600	545,295,600	34.45	125,402	561,748	22.3	203
1943..	55,000	11,500	192,296,600	545,589,000	35.25	129,751	556,295	23.1	209
1942..	49,800	9,900	152,490,300	456,257,000	33.42	101,015	473,797	21.3	196
1941..	43,600	7,100	94,173,700	369,308,000	25.50	64,151	375,411	17.1	168
1940..	35,800	5,900	49,896,000	270,420,700	18.45	53,877	304,267	11.8	163
1939..	32,000	4,800	34,195,700	215,129,600	15.9	28,419	236,857	12.0	147

Monica. The feeder is not provided with a regulating reservoir, and, consequently, the pressure varies widely in accordance with the flow, which is determined by the combined demands of the cities connecting to it. The varying pressure of the feeder and pressure differential with the city's system give rise to difficult operating problems.

Development of two new wells will eliminate the use of the Metropolitan Water District supply except for emergency standby purposes. These wells, one of which will be placed in operation this August and the second this November, will have a combined yield of more than 7 mgd.

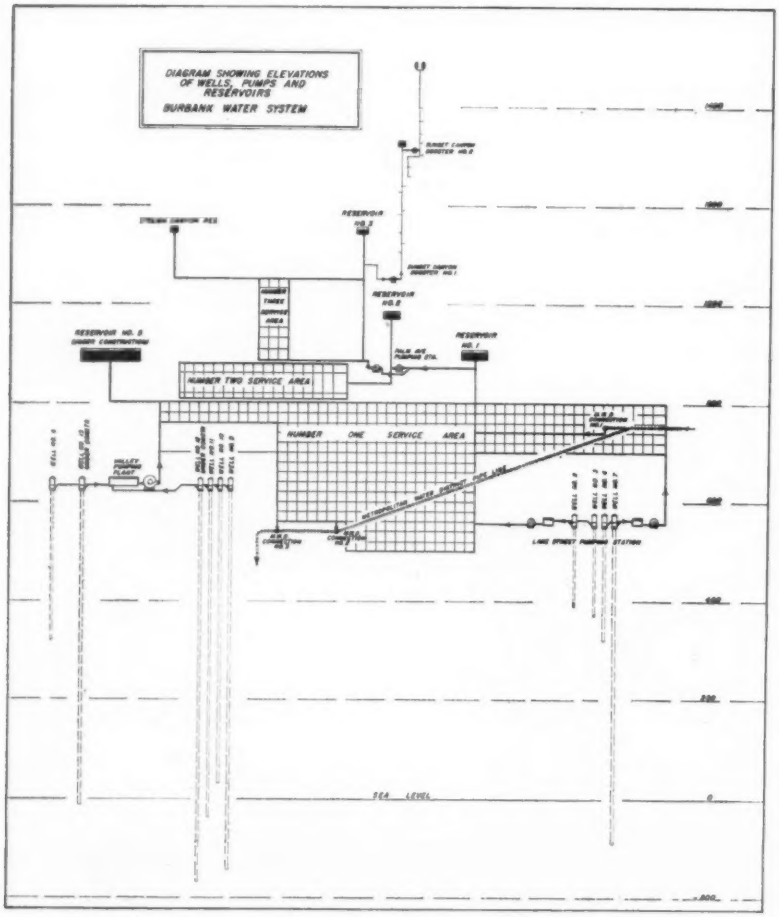
Two Wintroath 14-inch, 3-stage, deep-well turbine pumps have been ordered, with delivery scheduled for January 1948.

Booster Pumping Plants

Water discharges from the well pumps into open receivers, which in turn are connected to the suction side of booster pumps. These booster pumps impart the high pressure required for distribution throughout the system. The added production capacity from the two new wells, together with that from three existing wells on the 40-acre site, will be delivered into a five-million-gallon forebay, construction of which will be started this fall. In addition to storage afforded by the forebay, it will act as a settling and de-aerating basin. Additional booster-pump capacity will be provided by three new units, now on order, having an aggregate capacity of 17,600 gallons per minute. The booster pumps will be driven by 4,150-volt, synchronous motors, having a combined rating of 1,550 hp. The five-mg forebay, the booster pumps, and other additions at this location will cost over $250,000.

A booster pumping station to be known as the Palm Avenue Station is now 90% complete. This station, being built at a cost of $26,000, will replace an undersized, obsolete pumping plant. Its function will be to pump water from the No. 1 reservoir into the No. 2 and No. 3 pressure systems supplying the hillside area of the city.

Another major item of improvement planned for the water system is the installation of additional water transmission and distribution mains. These mains will interconnect all pumping stations, reservoirs, and points in the distribution system, forming a grid. An extensive program for the replacement of old undersized mains, consisting chiefly of 105,000 feet of 2-inch steel screw pipe, is now under way. Replacement will be made with Class 250 cast-iron pipe of various sizes, but none smaller than 6-inch diameter. Although progress in this work is seriously limited by the scarcity of cast-iron pipe, in the past twelve months more than 57,000 feet of new mains have been installed. The cost of new main installations will be approximately $570,000, and the cost of the replacement program approximately $320,000.



Water Softening Plant

A preliminary design has been made on a water-softening plant with a capacity of 25 mgd to match the output of the new booster pumping plant. This project, however, will not be undertaken until the more critical system deficiencies have been corrected. The softening plant will utilize a lime treatment, softening the water to approximately 100 ppm. This type of treatment will not impair the use of the water for lawns and plant life as do some water-softening processes. The estimated cost of the plant is $800,000.

Financing

Total cost of the scheduled program for the expansion and improvement of the water system, as enumerated in the foregoing projects, is approximately $2,800,000, and at least five or six years will be required for its completion. The Public Service Department, which operates both the water and electric systems, expects to accomplish this undertaking through the use of funds accumulated during the war years, plus the revenues accruing during the program.

NO INFLATION HERE

Montclair, N. J., Department of Public Works keeps costs down to 1926 level while performing greater services.

BY expanding and mechanizing its services and careful scheduling rather than curtailing them, the Montclair, N. J., Department of Public Works managed to keep its 1946 costs to a 1926 scale. Some highlights of these operations are recorded here.

Refuse. Although the volume collected increased 6% over the previous year to a total of 118,529 cubic yards, the cost was held to $1.32 per cubic yard or $14.50 per year per family. This figures approximately 14 cents per collection.

Leaf Removal. Along forty-seven miles of streets are 38,000 trees from which 3,300 cubic yards of leaves fall each year. Prior to 1941, 18,000 man-hours were spent in raking and loading the leaves into trucks at a cost of over $10,000 annually. Today, the crew consists of one laborer and five equipment operators who plow the leaves into piles with a broom mounted on the front of a truck and then load the leaves into 18-cubic-yard open-body refuse trucks with a Snogo rotary snow loader. The average daily output is 250 cubic yards, or 3.5 miles of streets, at a cost of $2,500 to $3,000 annually. In view of present wage rates, Town Engineer F. M. Galloway estimates that this operation saves over $15,000 annually.

Street Lighting. The average yearly cost was $75,747 from 1930 to 1940. The cost in 1946 was $71,928 for 2,240 modern electric street lamps, which replaced the old electric and gas lamps and now make Montclair streets among the best lighted in the nation.

Street Sealing. Thirty-five streets required 34,700 gallons of road oil and twenty-four carloads of stone; the work totalled 116,965 square yards, or about 8.5 miles. The cost was only 7.8 cents per square yard. By careful scheduling, the work was done in six working days.

Street Maintenance. It cost $6,030 to clean 15.4 miles, or 6.9 cents per foot; 1,175 cubic yards of debris were removed from 958 catch basins at a cost of $3.78 per basin, 34% less than the previous year. This reduction was due to mechanizing part of the operation by using a Hough front-end shovel to pick up the debris.

Street Cleaning. It cost $15,941 in 1946 to remove 5,930 cubic yards of debris. A total of 2,634 curb miles were cleaned with an Elgin sweeper. Hand cleaning amounted to $2,959. The unusually early fall of maple leaves in-

1. Montclair puts its Snogo into summer use by assigning it the task of scooping leaves into a refuse truck for disposal. This operation saves the town $15,000 a year. 2. Here is the broom-dozer that gathers the leaves into piles so that the Snogo can collect them. 3. A streamlined, mechanized, street-repair outfit makes the job of street patching simple. 4. Catch-basin cleaning costs go down when a front-end shovel digs into the debris and loads it quickly.

creased the cost of both street cleaning and leaf removal.

Street Patching. A total of 3,282 square yards was patched, the equivalent of 0.2 miles of 30-foot street. The cost of this was $1.84 per square yard. The work was done by two men and a mobile repair unit that consisted of a dump truck mounted with a compressor and equipped with lockers for air and hand tools. The truck tows a Littleford asphalt distributor mounted on a trailer.

Parking Plazas. Space is provided for 470 cars in five town-owned lots. Development of the major business district has been stifled for years by inadequate parking facilities. A study completed in 1946 revealed a need for space for 1,450 cars for all-day parking, and for 1,650 cars for shopper parking. The town has embarked on a program to provide adequate parking for the three-fold purpose of alleviating traffic conditions, preserving property values, and convenience of residents. The cost of the program will be entirely offset by meter revenue. Parking plaza operation cost $2,180, or about 1.5 cents per space per day.

The Montclair Department of Public Works is under the direction of F. M.. Galloway, Town Engineer.

Power Saw on Tower Truck Makes Pruning Easy

By HARRY TURNER
Secretary-Forester
Shade Tree Commission
East Orange, N. J.

QUITE some time ago, I was watching some climbers prune a large sycamore tree along the curb. They were suspended in mid-air, tied in with a safety climbing belt, a climbing rope thrown over the limb above them. The thought came to me that there must me an easier and safer way to cut those large lower limbs. For months I considered several ideas, all of them too costly for our budget. Then one day, my passing glance came across a utility truck whose workmen were repairing overhead trolley wires from an elevated platform. This was the brainstorm for which I had been waiting!

A Plan Set to Work

From the utility company I purchased a used tower truck, too small for their heavy line work, but just the right size for our application. Next came the problem of finding the suitable saw. After months of search and deliberation, I bought a 38-pound Universal one-man power chain saw with a 20-inch cutting blade. This saw, coupled with the tower, ended back-breaking and dangerous work. It boosted morale while saving man-hours.

In the past, the lower limbs, from 8 to 12 feet above the ground and from 4 to 24 inches in diameter, were removed by hand from a ladder or by a climber extended by rope in a safety saddle, the operation taking from 15 minutes to 2½ hours of hard work, depending upon the size of the limb. Now, with the use of the tower truck and the one-man power saw, an 18-inch butt limb can be removed in less than 3 minutes. The tower is manually raised and lowered by a clutch lever on the right-hand side of the truck and can be extended 21 feet into the air. The platform is 3 by 6 feet, swings on a fifth wheel and can be locked in any position in a full range of a 360-degree circle.

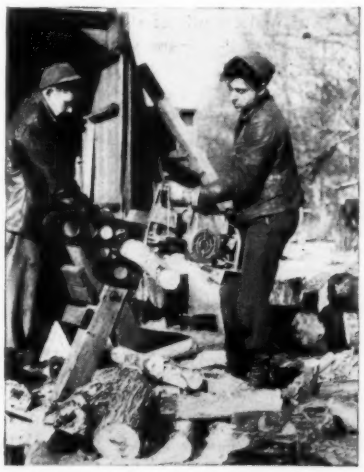
Prior to our using the tower truck, it was unwise to send a climber into a tree during an ice storm to remove branches which, due to weight of the ice, had broken and hung over the street. With the use of the tower and saw, this task can be performed safely under any conditions.

Another important use for this tower is putting climbers into trees where the first crotch is over 15 feet above the ground, thus eliminating a hardship on the climber who formerly would have to pull himself up, climbing hand over hand to this first crotch. Other excellent features are that the body of the truck is large enough to carry a sizeable load of brush, and that the tower furnishes the necessary height for spraying unusually tall elms.

The portable one-man power chain saw has a standard single-cylinder 3-hp air-cooled motor, and can be operated at any angle. A swivel-mounted carburetor permits quick shifting from vertical to horizontal cutting. This power saw is used not only for limbing, but also for felling trees up to 18 inches in diameter, and for cutting up cord wood which is sold by the Shade Tree Commission of East Orange.

Other shade tree commissions and city foresters could lessen their annual pruning costs and also provide greater safety and ease for their pruners with this type of equipment. The one-man power saw cuts labor costs and is simple to operate, with the saw balancing its own weight, leaving the operator to guide the blade. The manufacturer is Power Machinery, Ltd., Vancouver, B. C.

A tower truck (left and below) whose platform can be raised to a 21-foot height enables the tree pruners to use the power saw with ease. At right, the pruners use the saw for cutting cordwood for sale to citizens.



Transportation and Taxes in the Fluid City of the Future

By MABEL L. WALKER,
Executive Director, Tax Institute, Inc.
New York 7, N. Y.

THE American city is obsolescent. It is functionally outmoded. A new type of city adapted to present and future needs is struggling to evolve, but it is held back by the dead carcass of the past.

We hear a great deal of talk about the plight of the cities and there is scattered and piecemeal recognition of many individual factors in the situation, but there appears to be no comprehensive awareness of the metamorphosis which the cities are undergoing.

The reason for what is happening to the cities can be summed up very simply in one word—transportation. The city has offered employment opportunities, and people moved in to get work. It was not until the last few decades that it became possible to work in the city and live outside of it. But good roads, rapid transit, and local train and bus service have ushered in the age of the commuter. As transportation facilities become more highly improved, the periphery of commuter homes will push farther and farther into the hinterland. Also, as the amenities of country life are increased, the urge to flee to the country will be intensified.

In addition to the migration due to individual decisions, we have the migration brought about by the decentralization of industry.

There are other factors in the current picture which may speed up the decentralization process. One which we cannot ignore is the impact of the atomic energy development upon our whole way of life. It is true that people have always been willing to live on the side of a volcano, and probably relatively few individuals will leave the city for this reason, but it is likely that this development will bring about a certain amount of industrial decentralization, particularly in connection with plants producing military supplies.

Action to Be Taken

I have heard many persons speak of this decentralization movement as though it were an evil, or at least a deplorable thing. They advocate measures for counteracting it.

If this decentralization movement represents a basic human urge, as I believe it does, their efforts are going to be largely futile. The future population trends in the cities will not be determined by sociologists, city planners, real estate developers, engineers, or fiscal officers. This very important question is going to be answered by a much more humble person—the average wage earner. When ex-Corporal John Brown decides whether to settle in Weehawken or the lower East Side, and Mr. Shoe Clerk Sam Johnson debates the advantages of a little farm in Jersey versus an apartment in the Bronx, and when several million other relatively inconspicuous citizens face similar decisions, they will be making the population trends of the future. It is unlikely that they will be at all concerned over the city's past investment in utility services or the shrinking equity of a bank's realty holdings.

Some of these inconspicuous citizens will decide one way; some another. We cannot foretell their choices. But if they follow the pattern established in the last few decades, they will strain transportation facilities to the utmost in their outward pressure.

More important than attempts at coercion or baiting of home seekers is, I believe, a serious attempt to subject available data to the most searching scrutiny. Moreover, we need to supplement census data with commuting data, which do not seem to be presently available.

If the interpretation of such data substantiates the thesis here advanced, we should forget our feeble palliatives and make way for the fluid city of tomorrow. Instead of trying to stop the clock or reverse the hands, we should oil the mechanism and make the transitional process as smooth and painless as possible.

Easy Fluidity Essential to Municipal Well-Being

A speeding up of decentralization, which within the next two decades may mean a population loss as high as 20% or 25% for many central areas, is predicted by the author of this provocative discussion. The article comprises excerpts from a paper "Factors Affecting Municipal Revenues," presented by Dr. Walker on May 26, 1947, before the annual conference of the Municipal Finance Officers Association. Fluidity through adequate transportation is urged as a prime essential to future municipal well-being.

Fiscal Implication of Population Changes

A transit official said the other day when I was talking to him, "If you are right, this has tremendous implications for the transit industry." It has tremendous implications also for real estate, the construction industry, city planning, urban redevelopment, and the automotive industry. Needless to say, it also has implications for municipal finance.

What are those implications? First, we can probably anticipate a further decline in the relative importance of the property tax. It is true, of course, that many cities have annexed additional territory and thus have added to the property tax base. It is probable that considerably more urban territory will be annexed within the next decade or so. . . . If, even with the most ambitious annexation programs, we cannot hope to take in more than a portion of the present commuters; if we can anticipate, as seems likely, that the people of the cities will continue in their outward push and that the commuting radius will tend to lengthen, then we must readjust our thinking to the concept of a fluid urban life, with masses of people continually flowing in and out of the city as readily and painlessly as the ocean tides wash our harbors.

Some coming in daily to work; some coming to the city for the working week and spending weekends in the country; others living and working outside of the city but coming to it at frequent intervals for shopping, recreation, business, and other purposes.

If the city of the future is to have health and vitality, it must be possible for these great human tides to flow in and out easily and readily. We must think in terms of a fluid city. I believe we are facing up to a future where the maintenance of easy fluidity will

be the *sine qua non* of municipal health.

The fluid city of the future will not be less expensive to maintain than the static city of the past. During the transitional years it will be far more expensive, because these old cities of ours have got to be loosened up at their stiff old joints and elasticized in their hardened old arteries and that is probably going to be a more costly process than building them in the first place.

As the cities undergo this metamorphosis and painfully adjust themselves to their new role their fiscal problems will be acute. Probably one of the first things they will learn is that they must find some way of taxing the fluid population.

City income and city sales taxes are the only two productive levies that have so far been devised for this purpose. The flat-rate city income tax, collected at source, appears to be more productive than the sales tax and does not have some of the objectionable features of the sales tax. It reaches, however, only the working population of the city. This may, therefore, have to be supplemented by some other tax which falls upon persons who neither live nor work in the city, but who use it as a cultural, recreation, and shopping center.

Federal and State Aid

Will the federal and state governments help the cities through the painful period of changing from a static to a dynamic form of life? Probably yes, to a certain extent, particularly perhaps with respect to highways and streets. There may be, moreover, a considerable amount of reshuffling of functions with states, counties, and metropolitan authorities taking over functions previously carried on by cities.

There have been, however, some distinctly sour notes on the subject of federal and state aid emanating from various quarters in the last year or so. The tide may be getting ready to turn with respect to such aid. The cities may be helped in the future more through being relieved of certain functions and through more freedom in the levying of local taxes, than through ever-increasing subventions. I think the cities are getting a little tired at having to cringe and whine around state capitals for a handout and would like a chance to shoulder their own burdens.

Conclusion

In conclusion I should like to say that I have been interested in observing the decentralization of cities for more than a decade, but I have been deeply concerned during the last year or so as evidences of decentralization multiply on every hand, to note that municipal experts, while giving piecemeal recognition to several individual phenomena, apparently have no overall awareness of what is taking place. Even those persons who are talking of decentralization do not seem aware of the extent to which it is taking place. Is this outward movement a trickle or a drain? Can we anticipate population losses within the next two decades of 1%, 5%, 10%, or 25% or more? The available statistical evidence and other indications make a 20% or 25% loss (such as has already been experienced by Manhattan, the Basin District of Cincinnati, and the older sections of some of our other cities) appear to be more likely than a trickle of 1% or 2%.

There is much fretting here and there about patching up some leaks in the roof and repairing a broken window pane or so, but the sills and beams of your municipal fiscal structure appear to be rotting away, and unlike "Mr. Blandings" you cannot casually decide to tear it down and build afresh. The creaking old structure must be readjusted to modern needs.

Popular Criticism Justified

JUST as we question a man's ability when he looks sloppy and unkempt, similarly we question a bridge's ability to carry its required load when outward appearances indicate deterioration. The people of Dayton, Ohio, expressed just such critical judgment about one of the city's bridges recently, and engineering studies made by the city concurrently with these inquiries showed that these criticisms were justified.

The bridge is 588 feet long between abutments and has seven spans varying from 69 feet to 88 feet. The width between curbs is 40 feet and the bridge has two 8-foot walks. The original paving of brick was replaced by the city in 1923 with a medina block pavement on a concrete base. The structure is of the concrete steel-arch type, built according to a proprietary design. The reinforcing consists of steel ribs made of two pairs of angles separated by lattice bars of varying length and spaced 36 inches on center lengthwise with the structure. The upper part of the ribs are tied across all piers by steel plates with lower parts being anchored into the piers themselves. The concrete used was a 1:2:4 mix for the arches and a 1:3:6 mix for the piers. The piers rest on timber piling cut off 6 feet below the low-water mark.

A study of the bridge from a materials standpoint showed that it was entirely sound even though the surface conditions were in deplorable shape. Nevertheless, the Division of Engineering recommended to City Manager F. O. Eichelberger that:

- A speed limit be imposed on the bridge.
- A load limit be imposed.
- The surface be repaved to seal the inside of the structure from water and to lessen the vibration set up in the bridge by passing vehicles over the uneven pavement.
- A reputable, disinterested engineer be employed to check the original design in light of present conditions.

Acting on these recommendations, the city retained Professor Clyde T. Morris, Ohio State University, to study the design. Professor Morris concurred substantially with the recommendations. His analysis disclosed that the bridge had been designed with much less than the minimum amounts of reinforcing steel necessary for the flat concrete arches incorporated into the structure and, therefore, should be rebuilt at an early date. He reported further that the existing piers could be used and incorporated into any new structure that might be built.

Thus the bridge was dangerous to vehicles weighing in excess of 20 tons, not because of the deteriorated surfaces of the concrete in the abutments and piers, but because the thirty-year-old design was not equal to modern traffic requirements.

But, none-the-less, the public's suspicion was justified.

Laboratory Testing Pays

LABORATORY inspection and testing pays dividends, as H. C. Vensano, Director of San Francisco's Department of Public Works, will testify. The way it solved an acute problem with with the use of sewer-joint compounds is typical.

In this instance, the inspector of a sewer-pipe contract reported difficulty with the joints. Investigation by the Testing Section of the Bureau of Engineering showed that the contractor was overheating the material in the kettle used to melt the tar. This overheating caused the material to coke, thus reducing the penetration to zero and making the tar extremely brittle. One batch of the material was melted each day and not mixed as used, which resulted in the pure soft tar being used first and the settled filler and overcooked tar being used at the end.

This was remedied by melting smaller quantities of tar and adding fresh batches to the kettle each time a batch was removed for use.

Clockwork Pump Operation

A time-clock operates a well pump for the Orange, Calif., Water Department.

A TIME clock rather than a regulating valve governs the operation of the new Wintroath deep-well pump used in Orange, Calif. Superintendent Lewis W. Thompson has placed the pump across the town from the 250,000-gallon Chicago Bridge & Iron Co. elevated tank. An automatic electric time-clock schedule has been adjusted so that the period of operation coincides roughly with the period of high demand. When the pump goes into operation, the pressure in the vicinity rises about ten pounds. A Square D pressure switch will be installed soon as a precaution against the tank's running over should the demand drop below pump delivery.

The pump is connected to a 150-hp vertical motor and is delivering 1,250 gpm directly into the mains through a sand extractor against a total head of 350 feet. The pump is equipped with a column valve to prevent surging. This has successfully eliminated difficulty with sand, although when the well was developed a large amount of sand was uncovered. The well is 16 inches in diameter and 667 feet deep. It produces its rated 1,250 gpm with only a 16-foot drawdown. Its static level is 157 feet. A Sparling totalizing and recording main-line meter measures the flow from the well.

The Orange water department has in addition, three Byron Jackson deep-well pumps, one 200-hp, one 150-hp, and one 60-hp. These pumps deliver water into service reservoirs where it is taken by booster pumps into the distributing system against a 60-pound elevated tank pressure.

Above: This pump has a clock for an operator. Below: the tank is on the opposite side from the distribution system to insure even distribution of pressure.

Below: The water goes through a sand extractor on its way to the mains. As it leaves the extractor, it passes through a recording main-line meter.

Two Big Workmen for a Little City

Dragline and bulldozer take the heavy work out of municipal improvements at Cairo, Ga.

CAIRO, Ga., has two big workmen who are piling up an impressive stack of municipal dividends for this city of 6,000. One is a Buckeye Model 70 dragline purchased last September; the other is an Allis-Chalmers HD 7 bulldozer acquired in March of this year.

"It may appear surprising that a city the size of Cairo should be making extensive use of equipment like this," says City Manager Don Wolfer, "but I can assure you that it is paying off. The dragline has already earned us $6,000 in outside rentals and the bulldozer more than $90 per day. We already have a backlog of more than three months' unfinished work for both machines exclusive of municipal jobs. In fifteen months the private earnings alone will have paid for these two pieces of equipment, and we can consider their capitalized cost a gift to the city."

The bulldozer and dragline find extensive use in Cairo for drainage and grading work around the city.

Left: Cairo's city-owned dragline takes out a scoopful of earth as part of a drainage project. Right: The diesel-powered bulldozer at work on a grading project.

Lexington Rounds the Intersections

EACH year, M. J. McGruder, City Engineer, Lexington, Ky., picks out a few horse-and-buggy intersections with the corners built as square as a baby's block and rebuilds them with a 20-foot radius. This type of work is assigned as a slack-work job when immediate tasks are out of the way. Generally from eight to ten intersections per year are so improved.

The work frequently requires that

deft touch of diplomacy that city officials must often exercise. In one instance, a certain corner to be improved had two trees and a telephone pole on the area between the curb and the sidewalk. The housewife occupying the corner property had carefully planted a little flower garden around each tree and the telephone pole, and Engineer McGruder's crews reported that she was openly hostile to any improvement that would damage her floral display. So he instructed his crew to improve the other three corners and ignore the fourth.

The housewife watched the work in progress, heard the pleased comments of her neighbors, and observed that apparently her corner was to remain unimproved. Finally, she came to Engineer McGruder and demanded that he tell her what he planned to do with her corner.

"Oh," he said, "there are a couple of trees to take out, a telephone pole to move, and a nice bed of flowers. I think we'll leave it alone."

"Mister McGruder," she said in her best indignant-citizen tone, "I pay taxes at the same rate as everyone else around here. I demand that you make this corner where I live just as nice as those across the street."

So Engineer McGruder dutifully ordered his men to take out the trees, tear up the flower beds, move back the telephone pole, and round the corner.

"We could have just gone in there and done the work regardless," he said. "It was city property to improve as we felt was best. But if we had, that lady would have been barking at me yet. But as it is, we're now the best of friends."

The two top pictures show a typical street corner in Lexington, Ky. The corner, once no rounder than a carpenter's square, has given way to a smooth, easily maneuvered curve with a 20-foot radius.

City Engineer McGruder (above, at the right) takes a hand in the improvement of this corner. The completed job is shown at the left.

Overhead Storage Tanks

SOME POINTERS ON THEIR USE

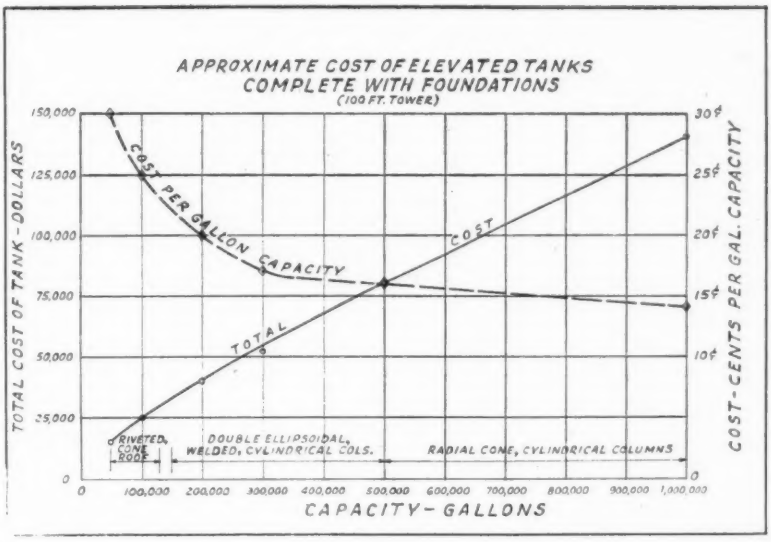
PRACTICAL fundamentals on the use of overhead-storage tanks were explained before the Indiana section of the American Water Works Association meeting held recently in Indianapolis, Ind. A paper was delivered by Donald H. Maxwell, Consulting Engineer, partner in the firm of Alvord, Burdick and Howson, Chicago.

An overhead tank, Mr. Maxwell stated, performs these functions:

- It supplies from storage peak rates of demand above the day's average rate of pumpage.
- It reduces pumping costs by minimizing the demand charge and the cost of energy.
- It provides uninterrupted service in case of power interruptions.
- When properly located, it increases the efficiency of the distribution system.
- It provides a reserve available for fire protection at times other than those of maximum domestic water use.

In general, the tanks should be located at the opposite side of the distribution system from the pumping station. Thus, when peak water use concentrates in an area between the tank and the pumps, the demand can be met partly from the pumping station and partly from elevated storage. This results in smaller mains and fewer variations in water pressure.

Theoretically, Mr. Maxwell indicated, the amount of water to be stored should be sufficient to allow the pumps to operate at a constant rate throughout an assumed maximum day and to supply all the water used by the city being studied. This calls for an analysis of the hourly pumping rates on a maximum day of domestic water use, with these analyses being extended over a period of years, if possible. However, cost considerations sometimes influence this storage figure, and it may not always be practicable to store enough to meet this average requirement. Mr. Maxwell gave for an example three systems that would have to store from 15% to 18% of the maximum day's pumpage in order to operate the pumps at a constant rate. They would have to operate from 30% to 70% over the average rate if no storage were supplied. In these cases, they could cut this excess pumpage rate by half if they stored between 4% and 4½% of the maximum day's pumpage, and they could cut the excess pumpage to only a quarter by storing from 7½% to 9½ percent.



Whereas the total cost of overhead storage tanks on 100-foot towers increases regularly from approximately $14,000 for a 50,000-gallon tank to $140,000 for a tank holding one million gallons, the cost per gallon stored does not follow such a constant relationship. The per-gallon costs of tanks ranging from 300.000 to a million gallons stay between 17 cents for the former and 14 cents for the latter. For tanks smaller than 300,000, the cost rises sharply, going to a high of 30 cents for the 50,000-gallon tank.

This indicates that a tank smaller than 300,000 is relatively uneconomical and should be used only in small communities. It also shows that when storage for more than 500,000 gallons is required, an engineer does not sacrifice cost by providing several elevated tanks suitably located on the system.

Where Standpipes Are Justified

Standpipes do have an economically justified place, particularly when lower heads are required, Mr. Maxwell explained. Costs show that up to a limiting figure of 75 feet over-all height the standpipes have definite advantages. Furthermore, they provide a reserve storage which can be credited to the cost of an equivalent clearwell of approximately $45,000 per million gallons.

Street Cleaning Difficulties

IN Dayton, Ohio, negligence on the part of the merchants causes the greatest obstacle in efficient street cleaning, and difficulty with parked cars the next. In violation of ordinances, the merchants will sweep dirt from their places of business into the street after it has been cleaned. This is reported by W. O. Pease, Street Maintenance Superintendent.

The city sweeps the downtown streets every night and the balance of the town on a fifteen-day schedule. In 1946, the city swept 12,732 curb miles at a sweeping cost of $1.087 per curb mile. There were removed 6,003 cubic yards of street dirt at a cost of $2.306 per cubic yard. Four Elgin belt-type sweepers are used for this task.

In winter, the street maintenance department solves the icy-street problem by the use of a combination of salt and cinders, having built up routes to handle the worst places as soon as they arise. In the downtown area where greater cleanliness is required, the crews apply a straight salt treatment. In either case, the city uses a set of five Flink spreaders to do the job. The salt and cinder combination generally is mixed at the rate of a ¾-yard bucket of salt to a truckload of cinders. The city keeps 150 carloads of cinders crushed if it can get the salt.

MODERN THEORY IS USED IN BEVERLY, MASS., TO DESIGN

The North Shore Shopping Center

A sketch of the buildings around the central mall, including, (1) department store; (2) retail stores; (3) restaurant and bowling alley; (4) exhibition bldg. and offices; (5) cinema; (6) nursery; (7) service station, and (8) heating and maintenance.

A RETAIL, service, and entertainment center, containing parking facilities for 3,000 cars, will soon be constructed in Beverly, Mass. The center has a surrounding residential belt and utilizes sixty acres at the intersection of three important highways eighteen miles north of Boston. The design of the North Shore Center, as it is to be known, is based on the knowledge that automobile usage has exceeded the peak of 1941, and that stores in existing shopping districts cannot readily adjust themselves to this usage.

The project is planned to accomplish the following objectives:

- To be completely, conveniently, and flexibly geared to the private automobile, users of which represent 70% of the purchasing power in the entire area.
- To provide an even greater density of productive pedestrian traffic per square foot of displayed merchandise than exists in present cities.
- To reduce costs of occupancy, selling, publicity, and delivery an estimated 13% in structures designed to obtain a higher ratio of net-selling space to gross area, greater sales per square foot, and economical operation at either normal or peak.
- To make available in the area the style and luxury merchandise not now available there and keep within the area some of the purchasing power being dispersed elsewhere against the will of the buyer.
- To provide a calculated balance between shopping and recreational facilities, each classification contributing increased volume to the other.

It is estimated that the total valuation of land, buildings, and improvements for the project will be approximately $6,000,000. The attractive, functional buildings will be arranged around a central pedestrian mall and will include a circular department store, thirty to forty individual stores, a large exhibit building, a motion picture theatre seating 1,500, an outdoor pool and skating rink, bowling alleys, restaurants, a branch bank, a post office, a telegraph office, a New England general store, a day nursery, beauty parlors, barber shops, bus and taxicab terminals, and offices for professional men. Consolidated warehousing and trucking, central heating, and ground and building services will be provided.

The project was decided upon only after intensive surveys of marketing and distribution trends. The trade area to be served was determined largely on the basis of an arbitrary 30-minute time-distance factor—calculated as the distance an average woman driver can drive at the rate of 15 miles per hour through congested districts, 25 to 30 m.p.h. on parkways, and 40 m.p.h. on limited-access highways. Estimates of the effect of competing facilities, per capita and area sales, disposal income, and potential customers were made.

Approximately 65% of the gross area provided for retail stores is for the sale of fashion and luxury goods, including general merchandise and apparel, i.e., "shopping goods" as distinguished from "convenience goods" and services. As determined by an analysis of community needs, other stores of every kind are included to provide a planned, combined pulling power.

Beverly officials, Chamber of Commerce representatives, and other citizens' groups who were asked for suggestions and informed about the proposed project at an early date, are optimistic of its future effects upon the development of the town. One of the planning features of the project is a residential greenbelt which will surround almost the entire center and which will include restored and relandscaped 18th Century houses in a "Colonial Village." A state-owned highway strip to the south will further aid in the protection of the surrounding residential neighborhood. Land around the development has been rezoned to avoid further commercial expansion and to protect the residential character of the area. In return for a parcel of land to round out the project itself, the developers have given 200,000 square feet of their holdings to the town for use as a playground adjoining the Beverly school.

Although the buying appeal of the North Shore Center is so designed that the business of Beverly downtown stores will undoubtedly be benefited by the overflow and increased local trade, local merchants have concluded that they will be compelled to modernize and improve their services to the public in order to keep abreast of the inevitable increased demands the new center will create for them.

The designers of the project have given careful attention to truck, bus, and passenger-car traffic approaches and exit routes. There will be a perimeter roadway around the parking areas so located that motorists can reach any

parking space easily and quickly after they enter the Center. The parking belt and its perimeter roadway will also be used by small panel trucks which will make deliveries to the various buildings. A central warehouse, to be erected on land in Beverly but outside of the Center itself, will act as the receiving depot for all shipments to the Center. As packages will for the most part be taken home by shoppers, pedestrian traffic and its relation to package pickup within the Center has also been carefully studied and worked out.

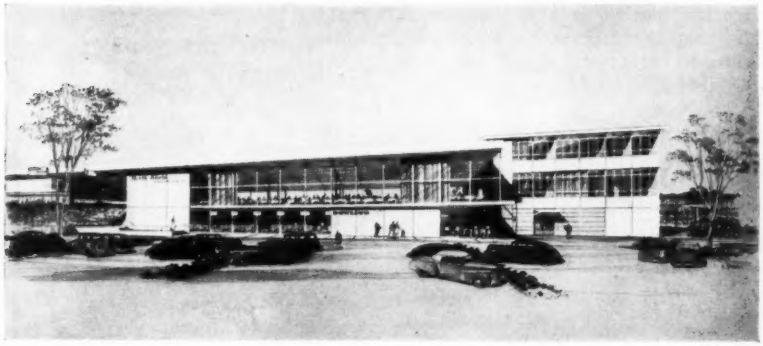
Other features of the project include a nursery building and an outdoor playground which will be used as a checking point for parents who wish to leave their children while visiting the Center. This will be adjacent to the major building, a circular-domed department store, 220 feet in diameter, designed for maximum efficiency of operation. It will be placed at the east end of the pedestrian mall. At the other end of the mall will be a two-story exhibition building for the display of materials or products available through local dealers around the North Shore Center territory. This building also will contain office space for rental to doctors and other professional men.

A large outdoor pool will border the exhibition building, the theatre, and the main restaurant. The pool is designed to be both an ornamental feature on the pedestrian mall and to have practical use as an outdoor skating rink during the winter season. Each building in the project will be connected with its neighbors by covered walkways, so that shoppers can walk under cover throughout the entire Center. Covered pedestrian passageways at selected points in the one-story buildings will provide access from the mall to the parking areas.

Finances and Designers

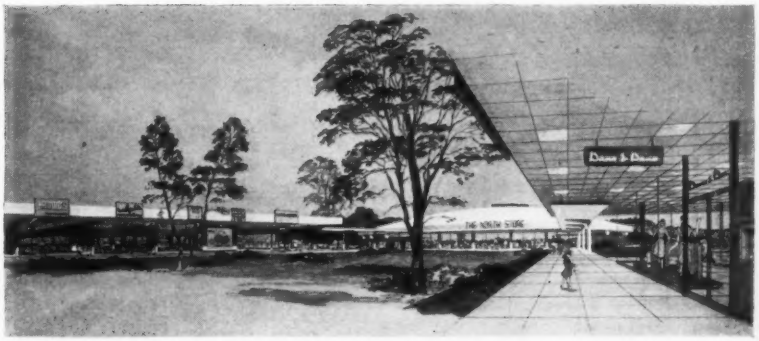
The North Shore Center will be developed and operated by National Retail Recentralization, Inc., an association of investing trusts, property managers, architects, marketing research men, and city planners. The company is owned by the Conant Real Estate Trust and by partners of Minot, Williams, and Bangs, managers of Boston real estate trusts, with a capital of $15,000,000. Projects similar to the North Shore Center are being studied in other trade areas around Boston and in New Jersey, Pennsylvania, Illinois, Michigan, and California. The professional staff of the company includes such experts as Morris Ketchum, Jr., New York; William W. Wurster, Ernest Born and Thomas P. Church, San Francisco; Kenneth C. Welch, Grand Rapids, and Frederick Adams, Lawrence Anderson, and Sidney Shurcliff, Boston.

The North Shore Center stores will be available on a rental basis, with fixed rentals ranging from $1.10 to $2 per square foot of floor area, plus 10% for parking areas, private streets, landscaping, covered walkways, and passages. Judging from the number of inquiries received from various companies and stores interested in negotiating leases, the developers report, they have little doubt about the project's success.



The restaurant with its glass walls and the exhibit hall are located at one end of the mall.

Here are the North Shore's twenty bowling alleys and its three-story office building for doctors and dentists, showing how convenient it will be for motorists to park and enter any part of the center.



This circular department store with its low-lying dome opens on both mall and parking area at the North Shore Shopping Center.

Hard Water . . . . . .

A new water improvement enables Roanoke, Va., to furnish either hard water with a sparkling taste or soft water not so palatable.

This new 2-mg standpipe helps to equalize distribution pressures.

IN Roanoke, Va., Charles Moore, Water-Works Manager, is puzzling over the problem of whether to distribute water pleasing to drink, but not soft enough to make it desirable for laundry or other purposes, or to distribute a softer water of an improved character for home and industry use but of a less pleasing taste. He has both; as a matter of fact, he needs both to provide an adequate supply to his city. But how he will allocate it to avoid complaints from the people of Roanoke remains his diplomatic task.

The situation arose when Roanoke completed a water-supply improvement that had been dormant for nearly twenty years. The city's primary source of water has been from a set of wells tapping an artesian well supply known as Crystal Spring. This water has a hardness of 140. Nevertheless, its taste is refreshing and its temperature low. Although recognizing the difficulties that it presented for laundry and other uses, the people of Roanoke have been justifiably proud of their water supply as a thirst quencher. Crystal Spring has a dry-weather flow of something less than 4 mgd. Coupled with this is a small surface supply that was acquired about thirty years ago in a water-works merger program. This supply delivered no more than 1.5 mgd. There are additional springs scattered about the city capable of producing roughly 1.3 mgd. Altogether, the city could count on approximately 6.8 mgd.

Balanced against this was a demand for water that made this supply look none too satisfactory. Estimates by Alvord, Burdick, and Howson, Chicago Consultants, showed that the city will require 7.2 mgd in 1950, 9.0 mgd in 1960, and 12.2 mgd in 1980, with the maximum day requiring 50% of these average figures. By 1950 the requirements for peak days would be 10.8 mgd, or more than 4 mgd more than the existing supplies could furnish.

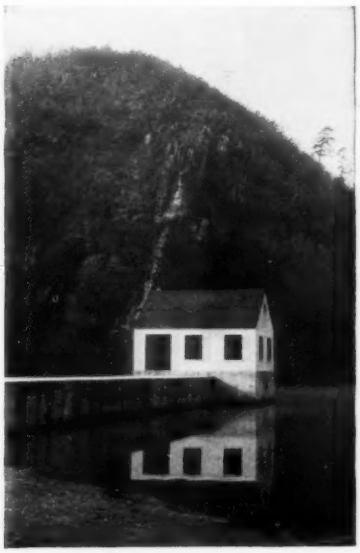
Water-works engineers in Roanoke had long recognized that this might occur. In 1928, the private company furnishing the water at that time built a concrete arch dam at the Carvin's Cove location. Desirable as this was, limitations of finance made it necessary to curtail development of the project. The dam site was particularly favorable, in a narrow rocky gorge that seemed to call only for a small concrete "plug" rather than a formal dam. The reservoir, when filled to the spillway elevation, impounded 6,470 million gallons, and stored it at a height of over 30 feet above the main overhead-storage reservoir of the city.

Later, in 1936, Alvord, Burdick, and Howson made a study of the various sources which the private company could draw upon to further develop its water supply. This detailed analysis showed that the Roanoke River would be the less costly source except for the fact that pollution made its use prohibitive. The study made by the engineers covered six different supply sources.

The Carvin's Cove water was the next most economical source, from the standpoint of both construction cost and annual operation. It had a total hardness of only 20 ppm and an iron content of less than 0.1 ppm. Consequently, all future developments hinged around its use.

The unfortunate financial situation under which the private company was forced to operate, however, made it difficult to capitalize on this new supply, and in view of the city's need for this additional water, condemnation proceedings were instituted. This meant that the city could take over the water utility and make the improvements it-

The filter room with its controls conveniently located for easy operator control.



Here is the Carvin's Cove Dam.

. . . or Soft?

Roanoke's filter plant building has the traditional lines of Virginia architecture.

self. This it did in 1938, and in 1943 the city again began a careful study.

The impounding reservoir at Carvin's Cove is unique on several counts. Although it is 70 feet high, over 50% of the capacity is in the top, 15 feet below the spillway crest. The watershed area also can be developed progressively as requirements dictate, giving the city ample supplies in the event that unanticipated growth should make it necessary.

The filter plant required to treat the impounded water was located more than a half mile from the dam, at a site roughly halfway between the elevation of the dam when full and the city's main distribution reservoir when full. The plant uses the familiar rapid-sand filter type of treatment. The water receives its chemicals and then is flocculated for 45 minutes by Jeffry slow-mix equipment and settled in a two-compartment settling basin for three hours. From here the water proceeds to a set of four 1.5-mgd filter beds, controlled by Roberts filter equipment, and so designed that its piping provides an unusually large, convenient pipe gallery. The engineers did this by placing the influent and backwater ducts at the back of the filter beds.

As the water leaves the plant, it goes to a 2-mg ground-storage reservoir located so that its mid-depth is the same as that of the city's main distribution reservoir. The engineers recommend that this reservoir be operated so that whenever the city's demand draws the level down below this mid-point, the Crystal Spring supply will augment this deficit.

A seven-mile transmission main connects the treatment plant with the distribution system. This main called for careful study to provide good gravity flow to the city. The study disclosed that a 36-inch line would provide a well-balanced economic relationship between flows that might vary from 6 mgd to 20 mgd. Inasmuch as the anticipated ultimate capacity of the treatment plant is 18 mgd, the 36-inch size has added economic value.

In the line as constructed, Lock Joint prestressed concrete pipe was used throughout, except for a half mile of 24-inch, cement-lined, cast-iron pipe at the end and at a point where taps into the line had reduced the amount of water delivered. There also is a short 12-inch cast-iron pipeline going to a reservoir.

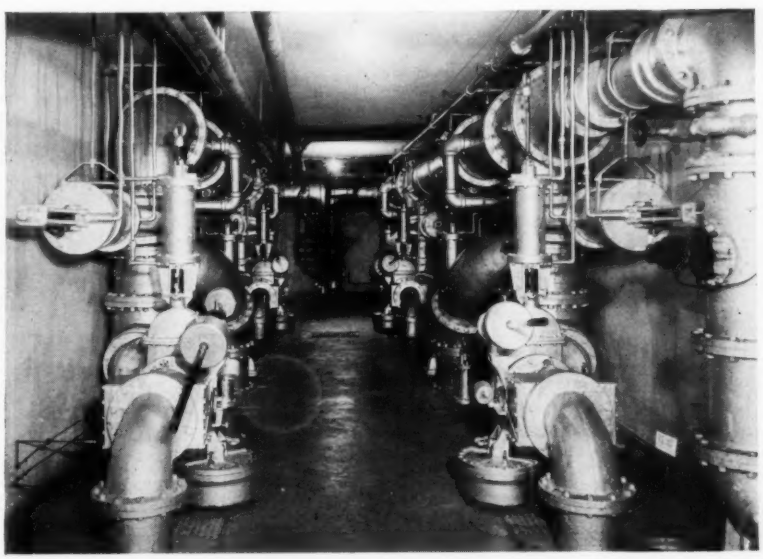
The distribution storage marked an important improvement feature of the project. Previously, the city had relied on its one Mill Mountain reservoir, which failed to provide adequate pressure all over the city. The new clear-well at the Carvin's Cove treatment plant helped to augment low pressures in the northeast portion of the city, and a 2-mg standpipe near the southwest section of the city, plus a fourth reservoir holding 2 mg at the northeast section, balances distribution sufficiently to make unnecessary any standby pumping and to make a pressure of at least 40 pounds per square inch all over.

Roanoke's water needs, insofar as quantity is concerned, need no further attention. Manager Moore can arrive at his office each morning with the assurance that the demand for water will not climb beyond the ability of his utility to furnish. His only problem is that of reconciling his customers to the hard, crisp water from Crystal Spring for part of the week and the flat, soft Carvin's Cove water for the remainder.

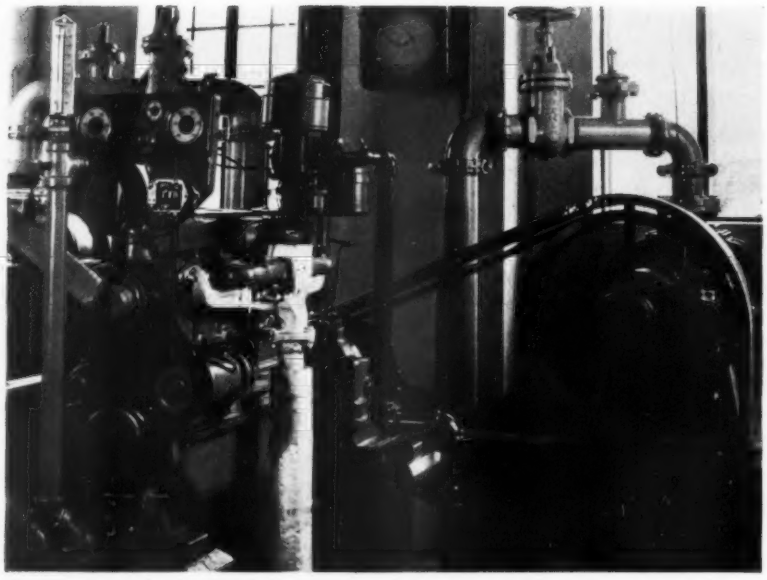
It probably would be better engineering for the city to use the Carvin's Cove supply to its full designed capacity and the Crystal Spring supply to meet any extra demand. This would mean furnishing a water that varied in character, and one to which the customers would never have the opportunity of becoming accustomed.

Manager Moore, consequently, is giving some thought to dividing the city into hard and soft water districts. This would allow people in each part of the city to become adjusted to the type of water they are receiving and to the taste of the water that they must drink.

The improvement was constructed at a cost of $1,776,000 under the supervision of Manager Moore, and W. P. Hunter, City Manager. Alvord, Burdick, and Howson prepared the plans and supervised the construction. H. Christianson was resident engineer.



The ample pipe gallery headroom results from relocating the filter ducts.



Day and night for six years a small engine like this has been in operation, powering a blower for the Celina activated-sludge plant.

Old Faithful

The record of operation at Celina, Ohio, shows that a sludge-gas engine may be economical for a small plant.

By PAUL A. UHLMANN
Paul A. Uhlmann & Associates
Columbus, Ohio

FOR more than six years a little truck engine has been running continuously day and night in a small sewage treatment plant at Celina, Ohio, driving an air blower in conjunction with two electric-driven blowers.

It has saved thousands of dollars in power and lots of grief for the plant superintendent when power failure silenced the electric motors and the little sewage-gas engine kept faithfully running at its constant speed.

Its tender, Carl Bauer, Superintendent of the plant, named it "Old Faithful" for its reliability in emergencies, and in gratitude for the numerous times when the aeration basins of his activated sludge plant were kept in agitation and at top performance by "Old Faithful" only.

In the original design of this plant, it was anticipated that the industrial wastes would increase the gas production sufficiently to warrant the installation of a gas engine, although no records of their volume and strength were available then. However, subsequent records show that wastes from the canneries, a milk powder plant, and a stearic acid manufacturing plant contribute a pollutional load of 10,000 population equivalent (yearly average loads) in addition to the normal population of 5,000 in the city. These industrial wastes produce excess loadings up to 50,000 population equivalent lasting as long as three weeks, and shock loadings up to 100,000 population equivalent lasting a few days only. Nevertheless, the plant is in fine shape. However, this is of only passing interest as far as the gas engine is concerned.

"Old Faithful" is a 6-cylinder General Motors truck engine, Model 2289, as used in G.M.C. trucks of 1939. It substitutes for a 15-hp electric motor.

It is not as streamlined as those "regular" sludge-gas engines and cannot display any intricate gadgets adorning those big brutes found in large sewage treatment plants, but it has performed like a thoroughbred after the initial operating troubles were eliminated.

The first difficulty was to obtain proper regulation of sludge gas and air so that the engine would operate continuously and efficiently. Having accomplished this, it was found that the engine would overheat due to back-pressure in the exhaust pipe. This was overcome by eliminating all unnecessary bends in the exhaust pipe.

The pipes of the water cooling system were changed to give better temperature control. A 160°F. thermostat was installed in the outlet end of the engine, after running tests had shown that the best operating temperatures were between 160 and 180 degrees. This eliminated the fouling of spark plugs and most of the troubles connected with sticking valves and carbon deposits on the valve stems.

Early in 1941, a safety control was installed to prevent overheating or operating without oil. This device automatically breaks the ignition circuit when the water temperature gets to the danger point, or when the oil pressure drops below the safe operating point.

Since the peculiarities of the engine had been fully recognized and the initial troubles eliminated, the gas engine has been running smoothly since the end of 1940. The records of its remarkable performance have been carefully maintained since January 1941.

Gas Engine Performance

The gas engine operates at a speed of 1,750 rpm, driving an air blower which discharges approximately 300 cubic feet of air per minute at a pressure of 7 pounds.

During the six-year period from 1941 to 1946, inclusive, the gas engine operated an average of 8,330 hours per year, (out of total of 8,760) or 95% of the time. The balance was used for servicing or minor repairs.

The longest period of continuous operation without any shut-down was forty-eight days. The engine operated without a major overhauling from August 1941 to November 1942, a total of 10,465 hours.

The same set of spark plugs was in use from January 1, 1942 to June 1, 1943, or a total of 11,799 hours. As the average speed of the engine corresponds to the speed of about 35 miles

Year	*Hours of Operation*	*Sludge Gas Used— Cu. Ft.*	*Maintenance Cost— Incl. Oil*	*Power Recovered KWH*	*Net Savings at 2c per kw*
1941	8,342	2,726,700	$ 99.51	109,068	$2,081.85
1942	8,436	2,574,000	102.42	102,950	1,956.58
1943	8,312	2,755,100	154.36	110,204	2,409.72
1944	8,386	2,827,700	200.28	113,108	2,061.88
1945	8,290	2,653,300	240.92	106,132	1,881.72
1946	8,205	2,698,500	158.95	107,940	1,999.85
Total	49,971	16,235,300	$956.44	649,402	$12,031.60
Yearly Average	8,328	2,705,900	$159.40	108,234	$2,005.27

per hour if it were driving a standard automobile, the engine would have covered about 400,000 miles before spark plugs were changed. Of course, it is neither possible nor advisable to try to duplicate this spark-plug performance in an automobile.

The gas engine is cooled by circulating the water through the radiators of the operating building and the heating coils of the sludge-digestion tank. This arrangement recovers almost as much of the available heating value of the sludge gas as if it were burned under a boiler.

The cost of electric power in smaller municipalities averages about 2 cents per kw. On that basis, the gas engine has saved yearly an average of $2,005 after the deduction of all operating and maintenance costs, or a total of $12,032 for a period of six years. The new gas engine, similar to "Old Faithful," was recently purchased for $243. In other words, the gas engine has paid for itself in less than two months of operation.

In 1942, the electric-driven water circulating pump, which carried the water through the gas engine and heating systems, became badly worn and had to be replaced. At that time it was found that the standard water-circulating pump of the gas engine would do the job equally well. Therefore, the operation of the electric-driven circulating pump was discontinued. except in case of emergency.

During the six years of operation, the following replacements were made: camshaft bearings, once; crank-shaft bearings, three times; connecting rods, four times; storage battery, five times; piston rings, six times and spark plugs, five times, and valves were ground nine times.

The oil was changed at intervals of about six weeks. All of the labor connected with servicing and replacements was done by the plant personnel, who have an intimate knowledge of gas engines and their peculiarities.

For financial reasons the sewage treatment plant is without supervision during the night, but "Old Faithful," equipped with safety controls, keeps running in tireless rhythm.

The splendid performance of "Old Faithful" during a period of nearly six and one-half years proves beyond any doubt that small gas engines are money-saving facilities in sewage treatment plants of moderate size. Due to the low initial cost as well as reasonable maintenance costs, small truck or automobile engines will pay for themselves in less than two months of operation. With a little effort, their constant satisfactory performance will last many years.

During the last fourteen years, the author has sponsored the use of four- and six-cylinder truck or automobile engines in small activated sludge plants as a means of reducing operating costs. Local conditions will determine the most economical use of the gas engine, either for pumping of sewage or driving an air blower or a generator.

The attractiveness of this plant scarcely gives evidence of the strong sewage it treats. The plant produces a 97% removal with a raw sewage having 600 ppm of BOD.

The present gas engine has now been in operation for more than 50,000 hours and is entitled to retirement. Several months ago the plant superintendent recommended the purchase of a new gas engine to F. D. Kuckuck, City Manager, under whose jurisdiction the sewage treatment plant has received full recognition and appreciation of the economical and efficient treatment of highly concentrated wastes from the community.

Superintendent Carl Bauer deserves full credit for the excellent performance of the faithful little gas engine, and for the careful recording of its performance as well as operating and maintenance costs. His complete records enable the author to evaluate the small gas engine's adaptability when limited amounts of sludge gas are available.

The performance of this small gas engine should not be considered exceptional, as it can be equalled everywhere if the plant operator makes a conscientious effort to give his sludge-gas engine the attention that it deserves.

Other Sewage Gas Engine Data

THE FOLLOWING figures have been compiled from data contained in the 1945 annual report of a sewage treatment plant serving a connected population of 51,000:

	Cu. ft.	Average BTU value		1000 BTU's	%Total BTU's Produced
Total gas production for 1945	16,993,700	x 600	=	10,196,221	100
Total gas consumed by engines	9,763,400	x 600	=	5,858,040	57.5
Total gas for heating buildings, digester, and laboratory use	3,216,800	x 600	=	1,930,080	18.9
Total gas for incineration	2,448,300	x 600	=	1,468,980	14.4
Total gas wasted	1,565,200	x 600	=	939,120	9.2
TOTAL	16,993,700			10,196,220	100.0
Total BTU's recovered from jacket water & exhaust for digester heating (51.2% of line 2)				2,999,316	29.5
Total heat required for building, digester, laboratory, and incinerator (Lines 3 plus 4)				3,399,060	33.3
Total heat required for other than power generation				6,398,376	62.8
Gas pfoduced in excess of that required for power generation				3,799,844	37.2
TOTAL				10,196,320	100.0

From this analysis it is noted that the *requirement* for heating digester, building, laboratory, and incinerator amounted to 62.8% of the total heat value of the gas produced. If engines were not used, the gas wasted would have amounted to 37.2% instead of 9.2%. After crediting the engines with the heat recovered and utilized, it is evident that 28% instead of 57½% of the gas produced was chargeable to power generation. For the year, the power developed amounted to 466,753 BHP. Based on a utility power rate of 1½c per kwhr, this represents a value of $6,158.00.

The table was prepared by E. D. West, Manager, Engineering Division, Climax Industries, Inc., Chicago. Mr. West's article on gas engines appeared on page 100 in the June issue.

Wartime devastation becomes an opportunity to plan

A New City for Naples

Looking from the west side of Posillipo Hill on the natural symmetry of Naples.

By **ING. DOMENICO ANDRIELLO**
Professor of City Planning
University of Naples

NAPLES, the greatest Mediterranean city and the finest seaport of southern Italy, is famous all over the world for its mild climate, the serenity of its sky and sea, its melodious songs, and the industry of its people.

Today, after having been subjected to more than a hundred aerial bombardments, endured the destructive fury of the retreating German army, and stood for a long time in the immediate rear of the front line of Allied forces, Naples claims the distinction of being the first Italian city to have prepared a comprehensive reconstruction plan. This general plan was exhibited to the Neapolitan public in the hall of the San Carlo Theatre in 1946 and is being examined by the Ministry of Public Works. Because of the almost total lack of financial resources and the complete destruction of most of the important factories, a definite planning policy is considered of the utmost urgency as a means of reviving its productive activities and recreational attractions.

Naples' first really modern plan concerned with the whole urban area of the city was approved in 1939 by the Ministry of Public Works, after having been studied by a committee of engineers and architects. The need for the plan arose largely because of annexations of surrounding suburbs by legislation in 1925 and 1926, which increased the metropolitan area from 65 to 111 square kilometers and enlarged the population to almost a million inhabitants. The 1939 plan was realized in part with the creation of a new business center (Rione Carita) and was being carried out, when war was declared and virtually all construction activity was suspended.

Urgency of Planning Problems

Planning questions were brought from a serious to a critical position as a result of the war's destruction. In 1945, chaos reigned supreme in all fields of public activity, and the future of our conquered nation seemed dark indeed. The municipal authorities of Naples decided to study a new scheme which would make use of some of the elements in the 1939 plan, but which would take into consideration the wartime demolition of areas of the city.

The new plan was considered necessary as a means of renewing the economic life and circulation of the city. It should be looked upon as a basic plan which takes into account the city's natural growth tendencies and which is designed to guide future development, both from an administrative and economic point of view. The most urgent problems faced in the plan were redistribution of the population over the urban and metropolitan territory and organization of traffic circulation.

The problem of space is a vital one for Naples. Population density in some areas is about 1,214 per acre, and it is not uncommon for six persons to occupy a single room. It is estimated that the population will increase by roughly half a million within the next forty years. Despite very bad living conditions, the housing shortage, and the lack of sunlight and air in the center of Naples, it is not easy to uproot people whose livelihood is fundamentally based upon a craft or a small-scale

trade, which is carried on chiefly in the central districts.

In order to decentralize and redistribute population, the new plan provides for the creation of a number of satellite towns to be placed at the fringe of the city. As their focal points, these towns will have existing minor residential or industrial centers which estimates indicate can be expanded into self-contained communities. These satellite towns may be divided into three groups: the western nucleus, connected with the development of the maritime zone extending from Bagnoli to Pozzuoli and including the fertile volcanic territory of Campi Flegrei (Burning Fields); the northern nucleus, connected with the agricultural development of the hinterland, and the eastern nucleus, connected with the industrial development of the Port of Naples.

With regard to the redevelopment of the central city, sanitation is the most urgent and vital of all problems. The task of fighting the overcrowding and insanitary conditions is difficult. It is not possible to limit the areas to be improved, for all ancient Naples, from Montecalvario to Corso Garibaldi, is in the same plight. It should also be borne in mind that sanitation, carried out only with a view to the general welfare and not for money-making purposes, constitutes a heavy financial burden, not easily met in conditions such as ours. Only a remarkable rise in the standard of living of the working classes and governmental assistance will help in solving this problem. Partial detailed plans have been drawn up for the reconstruction of two of the most heavily damaged central districts, and for the sanitation and improvement of all the other central districts. These plans await financial aid, and it is expected that they will be taken into consideration when circumstances permit.

Streets and Transport

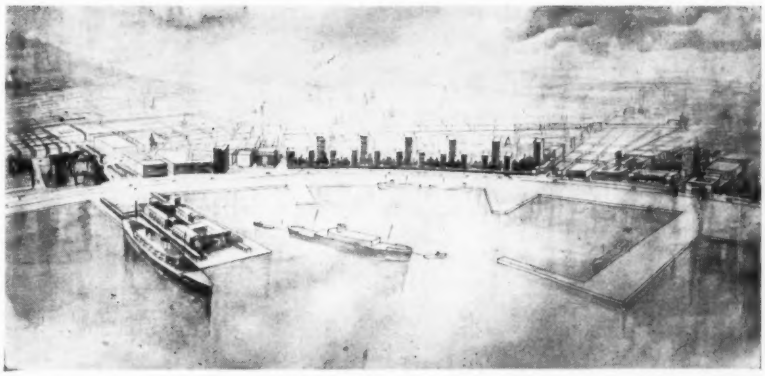
One of the objects of the plan has been to make the scenic attractions of Naples more accessible to the public. The newly developed areas will be set into the natural frame of the picturesque Bay of Naples, and new construction will be designed to prevent the disfiguration of spots of scenic interest and obstruction of the view of the Mediterranean. The central zone of the city has many monuments of historical and architectural interest and value. In the new plan, careful decisions have been made for the siting of new streets and other reconstruction so that the best of the historic monuments, many dating back to Greek, Roman, and medieval periods, will be preserved and enhanced.

The problem of decentralizing and better distributing the population over the metropolitan area is intimately connected with the problem of roads and transport. A good deal of progress has been made in Naples in freeing traffic movement, in spite of the narrow streets. Access roads to the national highways have been given considerable attention. The New Maritime Way which encircles the Port and parallels the waterfront for some distance is serving as the backbone for vehicular traffic needs.

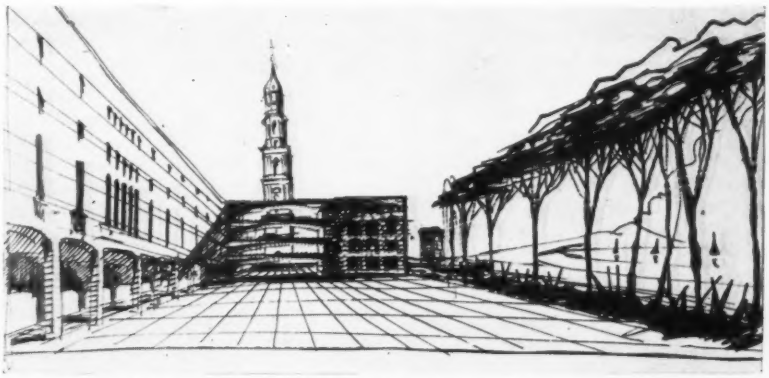
The 1939 plan made several suggestions, discarded by the Fascist government, for shifting the location of the railway station and the nearby industrial zone. The 1945 plan also suggested extensive railway station improvements. But, because of the costs involved and the necessity for an immediate reestablishment of transportation flow to help restore the city's economy, compromise measures have had to be adopted. These allow for a small expansion of the station eastward and help to ease traffic congestion by means of an overpass.

Sea traffic has been given special attention through plans for rebuilding wharfs and quays and the widening of port area now reaching into the very center of the city. The port area traffic is collected and distributed by the ample arc of the Maritime Way, which also takes on some important artistic-architectural functions in opening up the view of the harbor and adding to the attractiveness of several historical spots. The waterfront area was almost totally bombed out and furnishes an opportunity for complete redevelopment. In fact, owing to the urgency of restoring the flow of sea-traffic on which the life of our city mainly depends, a partial rebuilding plan of this zone already has been approved, and work has been started to turn the plan into reality.

Housing, however, remains the foremost need of the people of the city. We hope that both Italian and foreign capital may be attracted to this area. There are vast investment opportunities in the construction not only of houses, but of factories, hotels, and other buildings as well. Our dream of a dynamic, industrious city then will become a glorious reality.



The waterfront, business center and railroad station after redevelopment.



By widening this area along Maritime Way, a system of squares will be formed consisting of the one above and the ancient Market and Carmine Squares.

XUM

WHAT CONSTITUTES GOOD PRACTICE IN

Airport Management

—A UNIVERSITY OF ILLINOIS STUDY

THE management structure of an efficiently run airport should be as follows:

- The management of the airport department should be single and direct and should be responsible to the city's chief executive and city council.
- The manager of the airport department should be appointed and should be removed from office, when necessary, by the city chief executive and the city council.
- A definite line of responsibility and authority should be established for all interdepartmental positions.
- Coordination of the airport department with other city departments should be the responsibilty of the airport department manager.
- The airport department should be operated as a separate municipal-institution business, and operating results should be presented in a form comparable with those of other utilities.

Department Duties

Such duties should take the following form:

- Preliminary preparation of the municipal airport department budget in conjunction with the city's budget department.
- Supervision of expenditures for the airport in accordance with the municipal airport department budget.
- Supervision of maintenance of the airport and maintenance of city-owned buildings on the airport, in conjunction with the city's public works department.
- Responsibility for the collection of fees, rents, and other revenues incidental to the operation of the airport.
- Responsibility for initiating purchases for the airport, and for cooperation with the city purchasing department in completing such purchases.
- Responsibility for negotiating the renting of airport property, subject to the limitation that the renting may be only such as will promote the use of the airport in the general public interest, and any other limitations that may be set up by the city council.
- Responsibility for the recommendation of proper insurance for the city's protection from losses.
- Enforcement of the provisions contained in leases and agreements between the city and airport tenants.
- Supervision of the accounting methods to be employed by the city to reflect properly the financial affairs of the airport department.
- Responsibility for developing all practical sources of airport revenue which would be in line with the general policies of airport financing, as set forth by the city's chief executive and the city council, and which would assist in developing the city airport.
- Control of all flight activity on the airport.
- Control of all general safety procedures on the airport.
- Dissemination of all forms of airport ground information.
- Assumption of responsibility for representing the city in contracts with all other government agencies concerned with aeronautical activities.
- Responsibility for the transmission to the city's chief executive and to the city council of all general aeronautical information of importance in planning city policies.
- Leadership in the fostering and the promotion of aviation activity and commerce in the community.
- Checking to see that adequate service to the public is maintained.

Manager Qualifications

These came from a large city file. Smaller cities may safely waive some of the clauses to fit their conditions. Qualifications should be as follows:

- American citizenship.
- At least five years of responsible managerial, administrative, or executive experience in the field of airport management, aviation manufacturing, public utility management, commercial air transportation, military or commercial aviation operation, or in a large government operating department.
- At least two years of the five to be of a specialized nature in responsible airport management, administration, or regulation, such as director or assistant director of a large commercial metropolitan airport described by the Civil Aeronautics Administration as belonging to Class III or IV, or an equivalent aviation management experience of such scope and quality as to indicate the possession of the knowledge, skills, and abilities necessary.
- Education equivalent to graduation from a college or university of recognized standing. Each year of experience of either type stipulated, in addition to the minimum, may be submitted for a year of the education lacking.
- Good physical condition and freedom from disabling defects.
- Knowledge of airport management and maintenance problems, procedures, and techniques.
- A thorough knowledge of federal and state laws, regulations, and ratings applying to airports, air-traffic control, flight operation, and airport use.
- A good administrative knowledge of the engineering features of airport construction and equipment.
- A good knowledge of aviation history, development, practices, and terminology, together with an interest in the scope and development of aviation.
- Some acquaintanceship with the aviation and aeronautical industry in both its manufacturing and transportation phases.
- The ability to plan an operation, maintenance, and development program, and to coordinate it with general government activities and policies and with aviation development.
- The ability to prepare manuals and regulations executing the program and to interest agencies and private enterprise concerned with aviation in the program.
- The ability to analyze and assimilate a variety of data and to prepare attractive and convincing reports.
- The ability to deal tactfully and effectively with public officials, the Board of Airport Commissioners, subordinates, and the public, and the ability to speak effectively in public.

Manager Duties

Such duties should be as follows:

- Planning and directing of airport maintenance and operation.
- Supervision of the planning and direction of improvements.
- Maintenance of pleasant and orderly working relationships with tenants and patrons.
- Operation of the airport in accordance with sound business practices.
- Maintenance of runways, taxi strips, aprons, field area, fencing, lighting, roads, parking lots, hangars, administration buildings, and equipment.
- Understanding and appreciation of

the purpose and functions of the airport, and of how these are to be attained.

- Familiarity with airport operation, safety requirements, and various regulations pertaining to aviation.
- Arrangement and maintenance of proper coordination and cooperation among the various interests using the airport.
- Responsibility for the over-all management of the airport.
- Direction of the activities of all other airport employes.
- Supervision of all administrative functions of the airport, giving full consideration to the gaining of revenue for the city through the medium of direct revenue as derived from airline companies, fixed-base operators, concessions, etc.
- Supervision of the negotiations of contracts with operators and concessionaires.

Division of Airport Revenues

Hangar and storage	25%
Gas and oil	25%
Other rentals	19%
Landing fees	19%
Concessions (higher at air terminals)	8%
Commissions and other incomes	4%

Concession Policies

Storage	30-40%
Repairs	3-5%
Accessories	6-9%
Services	4-6%
New Planes	1-1½%
Gasoline	1-1½c per gal.
Oil	3-5%
Passenger Flights	8-10%
Cafeterias	5-8%
Lunch Stands	8-10%
Soft Drinks	9-12%
Table Service	7-10%
Candy and Confectionery	8-10%
Cigars and Cigarettes	6-8%

Expenses

Total Salaries	53%
Field Area	7%
Light, Heat, Power	8%
Field Lighting	6%
Hangars	5%
Runways	5%
Field Rent	4%
Insurance	3%
Taxes	1%
Automatic Traffic Control	1%
Miscellaneous	7%

These data were obtained from the University of Illinois Aeronautics Bulletin Number 1, entitled *Municipal Airport Management*, written by Dr. Leslie A. Bryan, Director, Institute of Aeronautics, Urbana, Ill.

A Street Cleaning Program

SAN Francisco is divided into four major districts, each under the supervision of a district director, who is in charge of cleaning the city's more than 1,600 miles of paved streets, five underpasses, its Stockton Street tunnel and numerous pedestrian stairs and passageways. These districts are divided into sub-districts which are swept by gangs and truck crews under the supervision of a labor sub-foreman. Eleven gangs are used in the residential districts with a twelfth to be reestablished as soon as men and equipment are available.

The localities requiring daily or near-daily service are swept by 132 blockmen. Seven motor-flusher routes are covered daily as are six motor-sweeper routes. Seven street refuse-can routes are in operation, serviced by three utility trucks. Eight truck routes operate as a combination paper pick-up from street cans and dirt pick-up from motor sweepers.

The personnel required to operate this service includes the following: Supervisory: 1 general superintendent, 1 supervisor, 4 district directors. Per Diem: 12 labor sub-foremen, 45 chauffeurs, 1 gardner, 260 laborers.

The equipment required for the work includes: 30 trucks, 1 rented truck, 4 Elgin motor sweepers, 1 Austin sweeper, 3 Austin patrol motor sweepers, 6 motor flushers, 100 street buggies, 1,600 street cans, 97 street sheds.

The city has on order six trucks, one Austin-Western sweeper, and eighteen can sheds.

These points were disclosed in the recent annual report of H. C. Vensano, Director of Public Works, to the City and County of San Francisco, Calif.

Above: A motor sweeper at work on one of the six motor sweeper routes in the San Francisco program. Below: This covered refuse truck has the added duty of collecting trash from the street cans and dirt from the motor sweepers. All street-sweepings and debris collected by the city are hauled away to two dumping grounds where they are disposed of by the fill-and-cover method.

XUM

The City Tells Its Story–IV

New Haven officials view one of the introductory panels in the Exhibition of New Haven's Improvement Projects sponsored by the Capital Budget Programming Committee. Left to right: Phillips Stevens, member City Plan Commission; Henry J. DeVita, President, Board of Aldermen, member CPB Committee; John Davidson, Aldermanic member Plan Commission; George J. Bassett, Vice-chairman City Plan Commission, CBP Committee; George Barnes, member City Plan Commission; Charles E. Downe, City Plan Engineer; Mayor William C. Celantano; Angus M. Fraser, citizen-member CBP Committee, and Harry B. Kennedy, Board of Finance and CBP Committee member.

Municipal Public Relations in Practice

OF all municipal government branches, your city or town planning department most needs the advantages of a working public relations policy because of the broad base and fundamental nature of planning.

If you understand that planning looks at the whole development of the city in the light of existing conditions, prevailing trends, and future potentials combining to affect the pattern of your community's growth, I think you'll agree with this.

In studying, analyzing, and programming for the best all-round municipal advancement, planning must necessarily consider the needs of all departments of government as well as of the municipality as a whole. Furthermore, it must translate these needs plainly, understandably, to the people—a real municipal public relations job. Without good MPR,* planning can neither make itself understood nor obtain the kind of development it seeks.

Very simply, you see, MPR is the means through which the planning process can gain initial public approval and successfully maintain public interest and support. Whatever success is achieved is measured in direct proportion to the power of your public relations. You've seen this proved wherever planning has been successful; you've seen it demonstrated wherever else planning has lagged.

The fact remains that, whether you conduct public relations in its own name or carry it out informally and unrecognized as such, you must proceed to gain attention for your plans and to impress them clearly upon the public.

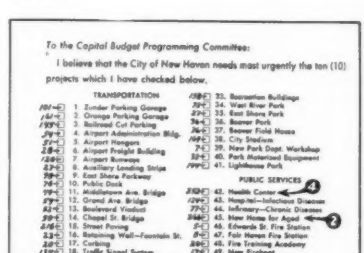
As city planners—and local governments—realize this more and more in the results gained either by informal or formal MPR, the tendency will increase to give public relations definite status, and to move from an amorphous, hit-or-miss type of approach to the application of professional MPR know-how • within your official family.

Until such time—well, here is a case history of what can be done with a lot of careful hard work. The whole story should be enough to prove the value of what I have referred to before* as "the conscious way, the know-how approach" and of recognition of its vital place in government.

We go to New Haven, Conn., (population 165,000), where, in a wing of the second story of the Public Library, New Haven's first exhibition pertaining to city planning was held from June 4-18, sponsored by the city's Capital Budget Programming Committee and called "Exhibition of New Haven's Improvement Projects."

The exhibition's objective was to bring sixty-four capital improvement projects forcefully to the attention of New Haven citizens and to get their opinion as to which they considered the most necessary for immediate action by the city government. To accomplish this poll of citizen thinking, (1) the projects were grouped, and clearly keyed by the use of color, into five categories: transportation, education, recreation, public services, and administration; (2) the visitors received a three-paneled folder titled "A Vote for the Future," the last panel of which listed the sixty-four projects for convenient checking—with a sixty-fifth blank for your own pet project! It was also a mailing piece. All you had to do was check the ten projects you thought most urgent, tear off this last panel, put a one-cent stamp on the other side and Uncle Sam would get it to the Committee!

And the people voted! Here is an official tally made at the half-way point of the projects' importance to the voters:


To the Capital Budget Programming Committee:

I believe that the City of New Haven needs most urgently the ten (10) projects which I have checked below.

TRANSPORTATION

101 1. Zender Parking Garage
64 2. Orange Parking Garage
195 3. Railroad Cut Parking
54 4. Airport Administration Bldg.
5 5. Airport Hangars
28 6. Airport Freight Building
126 7. Airport Runways
52 8. Auxiliary Lighting Strips
98 9. East Shore Parkway
74 10. Public Dock
11 11. Middletown Ave. Bridge
57 12. Grand Ave. Bridge
82 13. Boulevard Viaduct
39 14. Chapel St. Bridge
146 15. Street Paving
22 16. Retaining Wall—Fountain St.
26 17. Curbing
139 18. Traffic Signal System
98 19. City Map Revision

EDUCATION

137 20. Elementary Schools—remodel
237 21. Elementary Schools—new
102 22. Junior High Schools—remodel
129 23. Junior High School—new
284 24. Senior High School—new
177 25. Regional Trade School
16 26. Library—bookstacks
36 27. Library—balcony
24 28. Library—heating system
98 29. Branch Library—Oak St.

RECREATION

199 30. New Athletic Fields
239 31. Playgrounds and Equipment
89 32. Skating Rink—Handball Courts
88 33. Recreation Buildings
70 34. West River Park
235 35. East Shore Park
94 36. Beaver Park
76 37. Beaver Field House
169 38. City Stadium
7 39. New Park Dept. Workshop
32 40. Park Motorized Equipment
199 41. Lighthouse Park

PUBLIC SERVICES

252 42. Health Center
129 43. Hospital—Infectious Diseases
77 44. Infirmary—Chronic Diseases
256 45. New Home for Aged
5 46. Edwards St. Fire Station
9 47. Fair Haven Fire Station
220 48. Fire Training Academy
179 49. New Fireboat
9 50. Repair Shop—Fire Dept.
32 51. New Fire Apparatus
39 52. Underground Alarm System
57 53. New Police Apparatus
73 54. Police Training Academy
47 55. Storm Sewers
79 56. New Sanitary Sewers
139 57. Refuse Incinerator
9 58. Public Works Supply House
8 59. East Shore Sewage Project

ADMINISTRATION

195 60. City Hall
49 61. New Fire Alarm Headquarters
93 62. New Police Headquarters
63 63. New Education Headquarters
76 64. Voting Machines
65.

I recommend that these projects be undertaken

247 Immediately by bond issue

173 On a "pay-as-you-go" basis

Signature (if you wish)

Address

Total Ballots Cast = 594

The Show Itself

Here's how the exhibition stacked up. When you entered the foyer of the library, eye-catching panels caught you

* See page 7 of this issue.

* The American City for May, 1947, page 82.

By HENRY DAVIS NADIG
Director of Public Relations
Regional Plan Association
New York, N. Y.

at either turn: on the left, a striking triple panel with (1) a legend asking you to accept your responsibility for your city, to see the plan upstairs, and then to cast your vote, (2) an aerial photo of the city and (3) a brief color-key to the five groups in the exhibition; on the right, a double panel titled "Future New Haven" highlighted a few startling present conditions under the caption "This" and possible improvements of those conditions under the caption "Or This?" — the pictures clearly telling the story.

In the exhibition room upstairs, you faced a large map of the city. The introductory panel told you that all cities constantly need improvements and "the projects exhibited here are real and demand action." But they all can't be financed at once, so—"Cast your vote. This is your responsibility." And again the five groups were color-keyed to stress the grouping of projects. Then you turned right and caught the panel "This Is New Haven" on which one major condition in each category requiring action was color-keyed, highlighted in a photograph and underscored in turn as congested, un-economic, hazardous, unhealthy, and obsolete.

From there on through you followed successive panel groups on the five main subjects—each category pointing up a few well-known conditions and showing how they could be overcome through capital projects color-keyed and numbered for reference. The concluding exhibit pieces were the master-plan map of New Haven and the capital improvement cost picture, the latter in two panels, with another reminder about the individual's responsibility in determining New Haven's future.

Still another display was being added late in the exhibition days—a group pertaining to the harbor-front location of Route U. S. 1, just authorized by legislature and which, incidentally, has long been a part of New Haven's master plan.

Behind the Scenes

And here's the important background of this exhibition. I found three heroes: Angus M. Fraser, former member of the City Plan Commission and Board of Finance; Charles E. Downe, City Plan Engineer, and Mayor William C. Celentano. The first has been a key figure in Elm City planning. It was his persistence over a period of ten years that finally got planning established in New Haven. The second has been with the Plan Commission since 1941, and has a quiet, sound sense of public relations. The third, Mayor Celentano, not only has been farsighted enough to see the realism of planning but also is aware of what makes good public relations.

Capital budget programming was recommended by the City Plan Commission in 1941, but it remained for Mayor Celentano to appoint a Capital Budget Programming Committee a year ago. When it was decided to give the exhibit, most of the details fell to City Plan Engineer Downe, who has consistently placed himself in the posi-

New Haven of Tomorrow Exhibit Is Eye Opener

SUNDAY HERALD, SUNDAY, JUNE 15, 1947

6 Projects Show Public What's Wrong with City

The New Haven of Tomorrow, an exhibit planned and executed by the city's capital budget programming committee, should be viewed by every Elm city citizen before it closes at the public library on June 18.

A carefully conceived presentation of vital municipal improvements, the exhibit pulls no punches in parading every aspect of what's wrong with the city and the possible remedies.

Designed to give all citizens an equal opportunity to give their administrators an opinion on the 10 most pressing projects to be undertaken, the exhibit is a "must" visit for every voter who cares what happens to his tax dollar.

A total of 6? projects are offered to the citizens y, ranging from ways and means of straightening out the Elm city's traditional traffic snarl to the purchase of new voting machines.

Visitors to the show are asked to check off their choices of the 10 most necessary projects and drop their ballots into a ballot box at the door.

Utilizing the ballots, the committee will then report to Mayor William C. Celentano what they have found to be the general consensus of public opinion.

The exhibit's introductory panel, and a later one dedicated to Springside Home for the Aged are typical of the straightforward manner of presentation.

SPRINGSIDE FEATURED

Pictures of city hall, a dumpjay-walking pedestrians, closed-off streets and a downtown traffic jam are termed respectively obsolete, unhealthy, hazardous, uneconomic and congested.

The Springside panel tops the exhibit, bearing photostatic copies of reports by the building inspector, electrical inspector, food [illegible] health [illegible] tion buildings is stressed.

The development of West river, East shore and Beaver parks is posed, with a field house and new city stadium project being suggested.

Lighthouse park, say the planners, also should be developed with bath houses, rest rooms, a first aid station, a small restaurant and refreshment stands being added.

The exhibitors really hit their stride when considering public services, providing architect's drawings of a fine new health center, a hospital for infectious disease cases and an infirmary for cases of chronic illness.

The Springside report, already commented upon, follows.

Suggestions for improving the facilities and equipment of city departments, including police, fire, public works, park department and other administrative offices complete the exhibits.

During his weekly radio address, Mayor William C. Celentano declared: "I would urge upon you an active interest in the affairs of your city.

"A progressive New Haven means using what we have, adding what we need and getting what we want.

"Together with civic interest and co-operation, these can lead to more jobs, more business, better living conditions and better municipal services.

"Take an active interest in your government.

"Be sure to visit the planning exhibit at the library."

FRIDAY, JUNE 13, 1947

Vote For The Future

A striking and interesting exhibition of improvement projects that have been requested by municipal departments or other groups has been arranged by New Haven's Capital Budget Programming Committee, and will continue at the Public Library through next Wednesday. An original feature is the provision of ballots, on which visitors are asked to mark ten of the 64 possible projects displayed, as the im-provements considered most urgent, indicating also whether, in the voter's judgment, they should be financed by bond issue or on a pay-as-you-go basis.

The improvement projects are listed un-

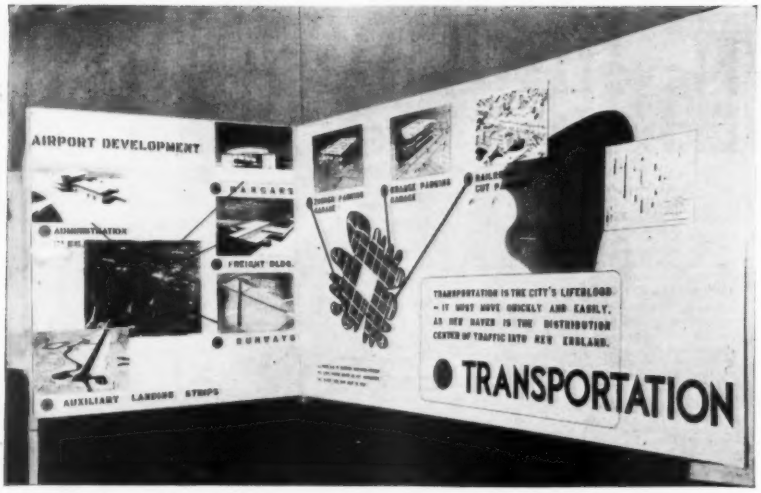
It is freely admitted that many more projects are shown than the city can finance during the next few years. A valuable emphasis in the exhibition is that on the citizen's responsibility for helping to decide that "this must come before that" and seriously considering how each improvement is to be paid for.

If the show accomplishes nothing more than driving home to citizens the principle that it is common sense to budget for public improvements as the city budgets for operating expenses, it will be worth while. The attendance and balloting to date indicate that rank-and-file citizens, if consulted, will do something to assure that the tax dollar spent for public improvements is spent wisely, in the right place and at the right time.

The Bridgeport, Conn., Sunday Herald gave an enthusiastic review of the exhibit which received running coverage in New Haven dailies. Lead editorial from the Journal-Courier notes importance of exhibit attendance and balloting.

The panel group of Public Service projects (above) in the New Haven exhibition received wide attention. Note panel on Home for the Aged—the project getting second highest in public opinion's urgency rating.

XUM



Street paving and a parking garage were two projects in the transportation panel and received sixth and eighth rating respectively in the exhibition's poll.

tion of helping other municipal departments (and thereby constantly tying them in with his department and showing the value of planning!) He therefore asked for requests from the various departments for the desired capital improvements. Then he released these requests to the press as pre-exhibition interest-builders!

The Library seemed to be the only fairly central place for the exhibition. Store windows or store space available was inadequate or unsuitable. Actually, the exhibit was a wonderful opportunity missed by New Haven's famed Malley's department store! I don't see how they could afford to pass it up—what with all that a better New Haven means to a major merchant!

In this first real attempt to do a public relations job for city planning in New Haven, Mayor Celentano and his Committee used newspapers, radio, fliers, the Chamber of Commerce bulletin, school children (who got 21,000 fliers—hitting about half of the city's families, Mr. Downe estimated) and service clubs. MPR-conscious Mayor Celentano has a fifteen-minute Sunday night radio program. He plugged the exhibition plenty. In addition, Mr. Downe let the reporters in on everything.

What New Haven will have accomplished officially by this exhibition remains to be reported after city government action on the capital budget. For the present, many more local people than ever before know about what can be done—and how—to overcome most of the conditions that are common local cause for worry. Handicapped by a small staff and with Mr. Downe handling the production of the exhibtion and most of the public relations details himself, the Committee put it over. Score for Engineer Downe for his planning MPR work; score for Mayor Celentano for his MPR leadership.

Two Words in Season

Two comments significant to you who are keen to improve your public relations have come to my attention this month, and they both bear out points you have found stressed in this department.

A. Earl Bryson, former Mayor of Winnetka, Ill., told the Colorado Municipal League on June 7 (in an address on "Publicizing the People's Business"):

"If the right talent is not available on the staff, or even locally, reach out, if necessary, to find the right person... It is too important to be poorly done."

Harry S. Reichenstein, City Clerk of Newark, N. J., spoke before the National Institute of City and Town Clerks last month in French Lick Springs, Ind., on "Office of the City Clerk and Public Relations." After describing the Division of Municipal Research and its importance to the city in its function (comparable to that recently recounted* about Manchester, England), he recommended a setup similar to that practiced, in a few instances, also in England:

"Clerks in cities of more than 100,000 population should have as their aide some person with a good knowledge of public relations. They may do this on a full-time or a part-time basis."

*THE AMERICAN CITY for June 1947, page 94.

$41,000,000 for Public Improvements in New Orleans

A COMPLETE face-lifting for the Crescent City will be made possible by the sum of $41 million which is to be spent for public improvements. New Orleans' taxpayers recently approved a $23.5-million bond issue for this purpose. Federal, state, and railroad contributions to the program will add another $17.5 million.

For this outlay, the city will get:

Seven overpasses and seventeen underpasses, tied into a railroad consolidation plan that will eliminate nearly all of the city's 144 hazardous railroad grade crossings and greatly reduce traffic on the rest.

$10.5 million worth of needed major street paving and repairs.

Land for a $20-million civic center of the future.

A $15-million union passenger terminal paid for by the railroads through the issuance of revenue bonds.

Removal from busy streets of many miles of tracks belonging to seven major railroads, elimination of several freight yards in built-up areas, and reduction of waterfront rail congestion. This at the expense of the railroads.

Filling of a six-mile canal that bisects the city. Work performed by the state highway department with the aid of federal funds will transform the canal bed into a railroad right of way and a super-highway.

Clearance of seven square blocks of slums to make way for the civic center and for widened boulevards designed to ease traffic congestion.

Citizens Plan and Discuss

The bond-issue election was the first major step resulting from two years of intensive planning and two decades of discussion. The union station and grade separation features were supervised by a Citizens Railroad Terminal Board, appointed in 1944 by former Mayor Robert S. Maestri and reappointed in 1946 by the present Mayor, deLesseps S. Morrison.

When it became apparent that the two projects were inseparably connected with the civic center and major street improvements, Mayor Morrison combined all three phases and appointed a 202-man citizens' committee to further passage of the whole program.

The New Orleans bond issue will necessitate no tax increase. Ten mills of the city's current tax revenues are now dedicated to liquidation of bonded indebtedness, and income from this source is expected to cover payment of principal and interest on new bonds.

The Allen reservoir, one of the city's ten which store 65 mg of water.

Water Is Popular In Pasadena

. . . and the Pasadena Water Department provides service that makes this popularity permanent.

By MORRIS JONES
Chief Engineer and General Manager
Water Department
Pasadena, Calif.

PASADENA, Calif., is a city of more than 100,000 people situated in the foothills of the Sierra Madre Mountains about ten miles northeast of Los Angeles. Noted for its homes and their well-kept lawns and gardens, Pasadena is also the home of the California Institute of Technology, one of the best-known technical institutions in the United States. Although there are many small industries located here, Pasadena is not considered an industrial city.

Throughout most of Southern California, the climate is semi-arid. The heaviest precipitation occurs during the winter and spring months, with little or no rainfall during the remainder of the year. The annual rainfall averages 20 inches.

Water Use High

The use of water is relatively high for a system that is 100% metered, averaging 140 gallons per capita per day throughout the year, with a maximum of over 200 gallons per capita per day during July and August. The total average use is 17 mgd, with a maximum day of 33 mg.

The water system has been municipally owned since 1912. At that time, the city purchased from the proceeds of a $1,125,000 bond issue the three major water companies that then supplied the city. Since then, the city has acquired thirty smaller water systems and has combined them into the present water system. The total assets today of the municipal water system are over $7,000,000. There is no bonded indebtedness. Water is now served to 32,000 consumers, 20% of whom live outside the city.

The Water Department is operated as a separate city department under the direction of the Chief Engineer and General Manager, who reports directly to the City Manager. Since its organization in 1912, it has not received any revenue whatsoever directly from the general tax levy. It has met all operation and maintenance costs, bond interest and redemption, and new construction work from its normal revenues. Water is furnished to the city for fire purposes and for flushing sewers free of charge. For park and powerplant purposes, the city pays the low rate of 6 cents per hundred cubic feet, or one-half the regular amount paid by other customers.

On the other hand, the Water Department pays for every service received by other departments of the city, including rental of space occupied in the city hall, light, power, heat, and janitor service, and portions of the salaries of the City Attorney, Controller, and other officers and employes rendering any ordinary or special service to the Water Department. In addition, 6% of the gross revenue received from the sale of water is transferred each year to the general city fund in lieu of franchise and general taxes.

Has Three Sources

The city secures its water supply from three sources, (1) gravity supply by diversion from mountain streams, (2) pumping from deep wells, and (3) the purchase of Colorado River water from the Metropolitan Water District.

Gravity Supply. Water is diverted directly into the system from the stream flows in the Arroyo Seco and Eaton Canyons. These canyons have drainage areas of 21 and 14 square miles respectively and collect the rainfall which falls on their water sheds. Most of the precipitation occurs in the winter and spring months, with corresponding runoff. The water in all canyons is collected by a submerged dam which diverts the water into the intake. No filtering is necessary as the stream flow clears rapidly after a rainstorm. Chlorination is the only treatment given. The mountain water furnishes from 15% to 20% of the total supply.

Pumped Supply. The city has thirteen pumping stations equipped with electrically operated deep-well turbine pumps located in different parts of the system. With the exception of one installation, all plants are housed in the

Pumped supplies constitute an important part of the Pasadena water system. Above: The Wilson booster station. Below: The Woodbury pumping station.

fire-proof reinforced concrete buildings.

The wells are drilled wells, using 26-inch double 8-gauge casing extending from the bottom of a dug pit at water level, in most cases, to bedrock. The average depth of the wells is around 600 feet, although at the Woodbury Well the casing extends to a depth of 1,200 feet below the surface and is the only one not resting on bedrock. The bowls of the turbine pumps are set in the casing at depths varying between 200 and 300 feet, depending upon the water levels, and are directly connected to a vertical electric motor on the surface. The capacities of the various plants vary from 300 gallons to 2,500 gallons per minute; the majority being between 1,500 gallons and 2,000 gallons per minute.

Eight of the thirteen pumping plants discharge directly into distribution reservoirs, one is used solely for the municipal power plant, and the others pump into the distribution system.

In the past, Pasadena and the adjacent area had been dependent upon pumped water for the major portion of the water supply. As far back as 1923 a recession in the underground water levels was noted, clearly indicating that this supply was insufficient for the needs of a growing community. The city, therefore, began a search for a new supply and finally settled on the San Gabriel River, located about twenty-three miles east of Pasadena. Filings were made with the State Division of Water Resources under which the city would conserve the flood waters of the river which, if not intercepted, would flow into the ocean.

The Morris Dam

With the proceeds of a $10,000,000 bond issue, the city, in 1931, began construction of the Morris Dam. This dam was a concrete structure 700 feet long and extending 275 feet above stream bed. The dam formed a reservoir with a storage of 37,000 acre-feet located at an elevation sufficient to provide a gravity flow to the city's main distribution reservoir. A 36-inch steel main was laid from the dam to bring this supply into Pasadena.

The project was put into service in May 1934 and continued to supply the city until July 1, 1942; at which time the dam and reservoir were taken over by the Metropolitan Water District of Southern California to be used as a reserve storage for their Colorado River project.

Metropolitan District

Before the construction on the Morris Dam was started, Pasadena joined the Metropolitan Water District. At that time, the district agreed to take over the Morris Dam and Reservoir and to compensate Pasadena for the cost thereof. Thus, the city had the advantage of the temporary water supply during the period of construction of the aqueduct.

The Metropolitan Water District of Southern California is made up of fifteen Southern California Cities, including Pasadena, Los Angeles, San Diego, and others. The water is impounded at the Parker Dam on the Colorado River and from there is pumped through 220 miles of canal, conduit, and tunnel to the Metropolitan Area of Southern California. Pasadena was a charter member of the district and has taken a portion of its supply from the district since July 1944. As has been previously stated, the gravity and pumped supplies for the city are limited so that all future growth of the city depends upon increased use of Colorado River water. For the year 1945-46, Colorado River water furnished 42.9% of the total water used in Pasadena.

The Colorado River water is filtered and softened by the district at its La Verne Treatment Plant located east of the City of La Verne about 30 miles from Los Angeles. The treated water is of an excellent quality, with an average hardness of 125 parts per million.

Storage

Water storage within the city totals 65,000,000 gallons divided among ten reservoirs. The main distribution system is divided into three pressure areas, each supplied by one or more of these reservoirs. In two of the systems a balancing reservoir is constructed at the end of the system, thus maintaining a more constant pressure throughout the area. The hilly sections of the city have their separate distribution systems, each supplied by a small reservoir or tank. Pressures in each reservoir system range between 40 pounds and 125 pounds per square inch.

All reservoirs are interconnected so that water can be released from the higher reservoirs into the lower ones.

Pumps are also installed to lift water to the higher reservoirs if necessary.

The reservoirs are 20 feet in depth and vary in capacity from 637,000 gallons to 15,000,000 gallons. All are cement-lined and are covered with wooden or galvanized corrugated-steel roofing. The steel roofs are supported by creosoted timber trusses on redwood posts. This type of roof is water-tight, and we believe that it will give from 50 to 75 years of service.

Plans are now being prepared for the construction of a 30,000,000-gallon reservoir in order to have more terminal storage for the metropolitan aqueduct supply. This reservoir, because of its location, must be hidden from view, so that it will be necessary to cover it with a flat reinforced concrete roof.

In the distribution system there are 375 miles of water mains, 80% of which is cast-iron pipe. Main sizes vary from 4 inches to 36 inches in diameter. No mains are now laid less than 6 inches in diameter, to which fire hydrants are connected. It is the present policy of the city to lay only cement-lined, cast-iron pipe or steel pipe protected with bitumastic enamel.

For feed mains, centrifugal-cast concrete pipe is used, or steel-cylinder pipe, lined inside and out with concrete.

Copper tubing is used for service connections in sizes of one inch or less. Galvanized steel pipe is used for 1½- and 2-inch connections. Services larger than 2 inches are cast iron.

The Water Department has its own maintenance and construction crews which take care of all but the largest projects. Recently, however, because of the large number of main extensions and replacements, it was necessary to contract some of the pipe installations.

Booster pumping plants are used for the distribution of the water from the deep-well turbines and from reservoir to reservoir, and they contain pumping units varying from 5 hp, which deliver 110 gpm, to 250 hp, delivering 6,400 gpm. The department is about to start construction on a new booster plant designed for a connected load of 1,000 hp. The first two units to be installed will be 400 hp each, and each will deliver 3,000 gpm.

New Sewage Pumping Station

. . . eliminates the bottleneck in the Thief River Falls (population 6,000) treatment plant.

A NEW pumping station will take the final kinks out of the sewerage system serving Thief River Falls, Minn. The pumping station, designed when this community had a population of only 1,500 people, has been a serious bottleneck, preventing efficient sewage collection now that its population is pushing 6,000.

Thief River Falls lies in flat prairie country and in order to bring the sewage to the treatment plant, lift stations are required as well as a siphon across the river. The old lift station, built in 1915, has only one submerged pump and a water siphon. It is virtually impossible to do a good repair job on the station because of its inconvenient structure.

The new lift station that is now in the process of construction will have two 100-gpm Fairbanks-Morse pumps of recent design. The old wet well will be remodeled. Its floor will have a 4:1 slope, with an aluminum bar screen having 1½-inch openings. It also will have two aluminum baskets measuring 18 by 30 inches with openings of 1½ by 1½ inches. There will be a second floor where the baskets are set in at level of the incoming sewage. Interchangeable gates will allow one basket to be removed for cleaning while the other is in service. Both wet and dry wells will be built under ground with an air-circulating fan. All light and power fixtures will be of the non-explosive type. The motors will be set seven feet under ground with the line shaft running to the pump, lifting the sewage 19 feet. The water level controls are to be furnished by the Automatic Control Co., St. Paul, Minn.

Thief River Falls' sewage treatment plant was built in 1939. Prior to its construction, the raw sewage went directly into the Red Lake River, which runs through the city. This proved to be one of those rare cases in which the community producing its waste suffered from its own poor housekeeping. The nuisance became very bad during the summer when the river level was low.

The treatment provided by the plant built in 1939 consists of a coarse screen, a comminuter, a primary clarifier, a dosing chamber, a trickling filter, a secondary clarifier, a chlorine chamber, sludge pumps and a digester with fixed cover. The digester is heated with sludge gas to keep it at optimum temperature.

The treatment has brought the river back to a sanitary condition and has made it possible for the towns south of the city to depend on the river for water without having to overcome herculean sanitary handicaps. Nor does the city itself have to contend with the noxious odors. A colony of beavers has established itself in the river just a few hundred feet down stream from the plant, and this would not have been possible if the sewage were not treated. Farmers living along the river can now water their stock in the river, where the cattle previously refused to drink.

The new sewage pumping station serves this treatment plant.

Ten Years of Sewage Treatment Progress

The Tallmans Island sewage treatment plant, of the activated sludge process type, was completed early in 1939.

By NATHAN I. KASS, *Chief*
Bureau of Sewage Disposal Operation
Department of Public Works
New York, N. Y.

THE third sewage treatment plant to be built in accordance with the city-wide program was the Tallmans Island plant, located in Queens on the shores of Flushing Bay. The complete neglect of the northern part of Queens as far as abatement of pollution was concerned, coupled with the fact that the site of the World's Fair, scheduled to open in 1939, was situated in the area tributary to this proposed plant, dictated the placing of this plant next on the construction program. As planned, the work on this project was completed on time, and the Tallmans Island plant was put in operation in April 1939.

This plant, which has a designed capacity of 40 mgd and a present flow of about 20 mgd, is, as in the case of Wards Island, of the activated sludge process type. In the design of this new plant, however, advantage was taken of further knowledge and experience gained by the engineers in the Bureau of Sewage Disposal. Among other things, "step aeration," developed by Mr. Richard H. Gould, engineer in charge of sewage treatment in New York City, was incorporated at this plant. This method provides for the admission of settled sewage into any one of four passes of the aeration tanks and not only through the first, as in conventional design; while the entrance of the return sludge is restricted to the first pass alone as practiced hitherto.

Other deviations from the Wards Island pattern introduced at the Tallmans Island plant were the specially designed sludge thickeners for the concentration of excess sludge; separate sludge digestion, and the resulting utilization of gas as a fuel for engines directly connected to the main sewage pumps and to the blowers supplying air to the aerators.

The waste heat from the engines is usually ample to provide for the heating of the buildings and digesters. But in case of a deficiency from this source, heating boilers can be fired with utility gas. Purchased gas can also be used in the engines whenever the gas generated in the digesters is insufficient for plant operation. The need for the utility gas has been considerably reduced recently because of the conversion of one of the gas engines to a dual-fuel engine using either gas or diesel oil or both.

The sludge from the digesters at the Tallmans Island plant is pumped to storage tanks and removed to sea by the sludge vessels provided for the Wards Island project.

Next in line for construction was the Bowery Bay plant. Considerable pressure was exerted to have this plant, located on Bowery Bay, in operation before the opening of LaGuardia Airport situated across this bay.

The plant, having a designed capacity of 40 mgd and a present flow of 38 mgd, was constructed in two stages. The first stage included that part of the plant which provided for primary or partial treatment only. It consisted of the screening and grit chambers, pumps, primary settling tanks, and grit and sludge storage tanks. This work was completed in November 1939, and the digesters were put in operation the following spring.

The second stage of construction, completed in March 1942, included the aeration tanks, final tanks, thickening tanks, engines, and all appurtenances. Thus the Bowery Bay was the city's third activated sludge process plant to go into operation and the second one with provision for "step aeration."

The utilization of sludge gas at Bowery Bay as at the Coney Island plant differs somewhat from that at Tallmans Island. In the latter, the gas engines are directly connected to the pumps and blowers, while at Bowery Bay and at

PART II—Mr. Kass describes the development of five more sewage plants in New York City and completes the story of its progress along this line.

Coney Island the gas engines are the motive power for driving electric-current generating units.

The power produced through the use of sludge gas is insufficient to meet all the needs of this plant. It is, therefore, augmented by the purchase of utility power.

The sludge from Bowery Bay also is carried to sea by one of the city's three sludge vessels.

City-Harts Island

In 1942 another plant came into being—the City-Harts Island plant.

The treatment works are located on Harts Island on Long Island Sound, and consist of plain sedimentation and separate digestion. It is the smallest of the city's modern sewage treatment plants, with a designed capacity of only 1½ mgd and a present flow of less than 1 mgd.

The sewage from City Island is pumped through a force main into the sedimentation tanks at the Harts Island plant.

During the summer, the effluent from the sedimentation tanks is treated with chlorine to provide additional protection for the bathing areas located in the vicinity of the plant.

The gas from the digesters is used for heating purposes only.

Jamaica Plant

The original Jamaica plant, located in South Ozone, Queens, was built in 1903, and during 1926 and 1927 it underwent certain changes. But the method of treatment was still limited to fine screening until October 1941, when the reconstruction of this plant was started to incorporate secondary or biological treatment through the use of the activated sludge process.

In the new design of this plant, it was decided not to abandon the fine screens, which were built at considerable cost, but to use them instead of primary sedimentation tanks. Realizing that fine screens remove at the best only about 10% of the suspended solids as compared with a 55 to 60% removal in sedimentation tanks, this substitution presented a rather interesting deviation from the accepted practice. In September 1943, all the changes and additions were completed, and the fourth modern treatment plant of the activated sludge process type was placed in operation.

The Jamaica plant, with a designed capacity of 65 mgd and a present flow of 35 mgd, incorporates the fine screens preceded by coarse and fine racks, and by grit channels; aeration tanks; circular final settling tanks; sludge thickeners; sludge digesters; screenings; dewatering, and chlorination equipment.

The gas from the digesters is used in three 1,440-bhp capacity engines which drive the generators furnishing light and power for the operation of the plant. Additional power to supplement that derived by the use of sludge gas is obtained through the purchase of electric power and utility gas. The engines and the blowers furnishing the air to the aeration tanks and to the auxiliary equipment are housed in a separate building.

The digested sludge at the Jamaica plant until recently was either dried on sand beds built near the plant or carried to sea from a dock close to the plant. The construction of the Idlewild Airport will eliminate these facilities, and it will be necessary now to pump the sludge to a storage tank on a newly built dock, two miles from the plant, and transport it to sea in the city's sludge vessels.

Pilot-plant studies of the activated sludge process, carried on prior to the opening of the rebuilt Jamaica plant, revealed that a modification in this type of treatment, consisting mainly in carrying a lower solids concentration in the aerators than was the established practice, produced an effluent that is entirely acceptable under many conditions. The advantages of this method of treatment, called "modified aeration", are a lesser quantity of air required and the production of a sludge which can be concentrated to a higher-solids content. Both of these features affect a greater economy in plant operation.

Convinced of these advantages, the operation of the Jamaica plant was carried on the "modified aeration" basis with results which met the expectations of the engineers and chemists of this department.

The effluent from this plant is chlorinated during the bathing season.

26th Ward Plant

The 26th Ward Sewage Treatment Plant, located on Jamaica Bay in the Borough of Brooklyn, was built in 1897. It went through many changes, but until 1944, the treatment was still limited to fine screening.

Reconstruction was started in 1940 to change it to an activated sludge process plant with a designed capacity of 60 mgd. Because of the difficulties imposed by wartime conditions, only the first stage of treatment, including primary sedimentation tanks and sludge digesters, could be brought to completion. This took place in June 1944. The present flow at this plant is 38 mgd.

The digested sludge at the 26th Ward plant is dried on specially prepared sand beds, and it is expected to be used for soil conditioning at this location.

Pictured above is the City-Harts Island plant, on Long Island Sound.

During the summer months, chlorination is an added treatment feature at this plant.

While at present the 26th Ward plant is limited to primary treatment until conditions will permit its completion as an activated sludge plant, it is, nevertheless, a modern plant which becomes an integral part of the ultimate scheme of sewage treatment in New York City.

Recapitulation

New York City's achievements in sewage treatment for the past decade can be summarized as follows:

During this period the city built seven modern plants having a combined designed capacity of 500 and a present flow of 400 mgd. The construction cost of these new plants amounted to $57,500,000.

The difference in the pollution abatement of the harbor ten years ago and abatement at the present time is evidenced by the figures. Just prior to 1936, only 13% of the total sewage flow was treated, and the removals were only about 1% on the basis of suspended solids. At present 42% of the city's sewage, or 438 mgd, is being treated. Of this quantity, 313 mgd are subjected to the activated sludge process, 54 to chemical precipitation, 40 to plain sedimentation, and the remaining 31 are limited to removals of some solids by fine screens. The over-all reduction of harbor pollution, primarily through the operation of new plants, increased from 1% to 32% of the total load.

This marked increase in pollution abatement in 1946, as compared with that just prior to 1936, can be further realized by the fact that at present the quantity of suspended solids removed from the sewage is 300 tons per day on dry basis, while a decade ago it amounted to only 11 tons. The disparity in the BOD removals is equally great.

It would be remiss not to include in these considerations the economic aspects involved. In 1934, for instance, the cost per ton of dry solids removed was about $117.00, while in 1946 it dropped to somewhat below $20.00. This contrast is, of course, much more striking in view of the marked rise in prices from 1934 to 1946.

In conjunction with the treatment of sewage in the modern plants, the benefits derived from the by-products are of considerable importance. Of these, the one of greatest value is the utilization of the sludge gas from the digesters as a fuel in the engines. There are at present a total of sixteen engines installed at four plants, having a combined output of 10,500 hp.

During 1946, nearly 370,000,000 cubic feet of sludge gas were used in these engines. This quantity of fuel produced from sewage sludge represents approximately 16,000,000 kw-hrs, or over 62% of all power requirements at the city's treatment plants where gas engines have been installed.

The digested sludge from the Coney Island and 26th Ward plants is dried on sand beds and stored for future use as a soil conditioner.

The utilization of a third product, namely, the skimmings from the sedimentation tanks, came into the picture when the need for increased recovery of fats made itself felt on account of the war.

A contract for this material was prepared and let in 1943. These skimmings contain about 50% dry solids by weight, and 70% of the solids represent fat. The skimmings are collected by the plant force in cans which are removed by the purchaser to his plant for rendering. The city receives 80 cents per 100 pounds of skimmings as collected.

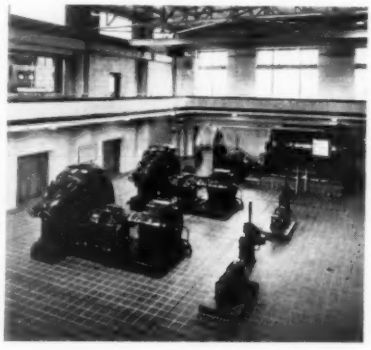
While this article is concerned primarily with those accomplishments which manifested themselves in actual construction of sewage treatment plants since 1936, the picture of the progress made in the past ten years would be incomplete were we to omit the fact that during the years of World War II the city had prepared plans and specifications for six additional plants, having a total designed capacity of over 700 mgd. Some of the "blueprinted" plants are ready for immediate construction.

The Bureau of Sewage Disposal Operation expended $2,110,000 during 1946. The activities of the bureau include the operation and maintenance of the thirteen sewage treatment plants, the seventeen miles of interceptors, the three self-propelled sludge vessels, the three sludge barges, and other functions pertinent to the work of the bureau.

It is interesting to note that notwithstanding this considerable expenditure, the cost of sewage treatment in the areas affected by the plants amounted only to about 70 cents per capita per year—a modest outlay for such an important service.

$199,000 Saved by Gas Engine

FOR a $30,000 original investment a gross savings of $199,000 over a period of seven years can be considered a fair return. Consequently, Ft. Wayne, Ind., has every right to be satisfied with the way its 465-hp Worthington gas engine is serving its sewage treatment plant.

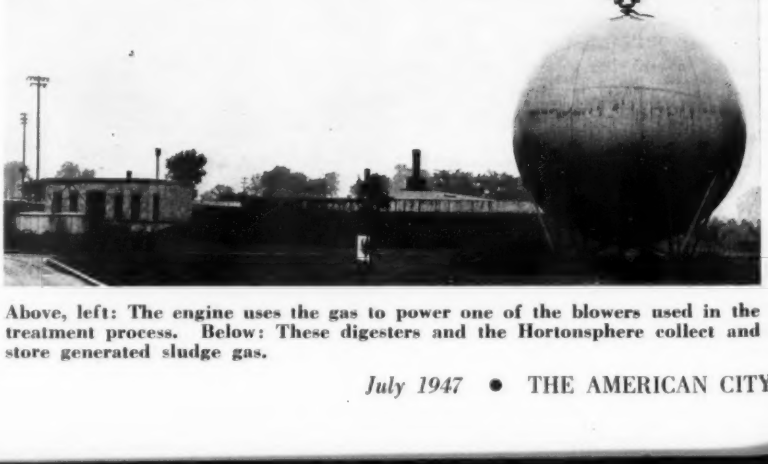


The $199,000 saving for the seven years represents what it would have cost the Ft. Wayne Sewage Plant for electric power had its gas engine not been in operation. For 1946 alone the gross saving was $38,000.

The engine also contributed to the heating of the sludge digesters by circulating water from the engine-cooling jacket. In 1946, Superintendent Ralph A. Hoot reports that nine billion BTU's of heat were transferred from the engine to heat the digester. This is the equivalent of 650 tons of coal.

In addition to utilizing sewage gas for running the gas engine, sewage gas is also used for heating the plant and for laboratory purposes. The total savings for fuel oil for plant heating in 1946 was $1,541.

The plant was built in 1940. During 1946, it treated sewage at a rate of 18.7 million gallons per day.



Above, left: The engine uses the gas to power one of the blowers used in the treatment process. Below: These digesters and the Hortonsphere collect and store generated sludge gas.

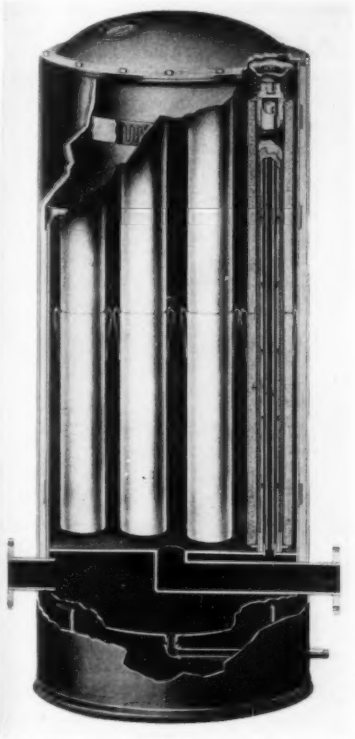
Oil Purification and Filtration

III. Lubricating Oil Filtration

By BRIAN CORRIGAN
Technical and Research Division
The Texas Company
New York 17, N. Y.

THERE is a definite relationship between effective lubrication, oil purification, and filtration. Clean oil throughout the period of its useful life logically is good insurance for dependable lubrication.

In addition to protecting lubrication, proper reconditioning of lubricating oils also has a marked psychological effect upon engine or machinery operators. It is a real contribution to more economical maintenance. The elimination of worry and mental strain is a decided asset.

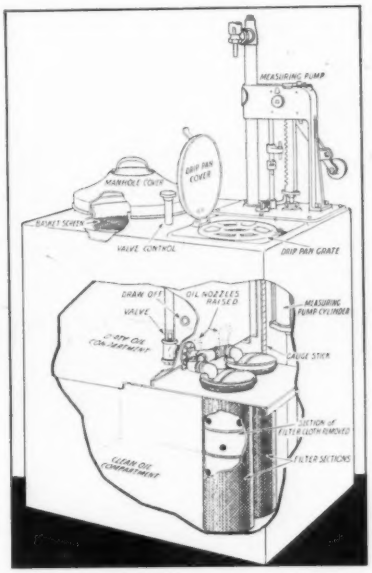


COURTESY HONAN-CRANE CORPORATION, LEBANON, IND.

Cutaway view of a 24-cartridge *Honan-Crane* "M" Type continuous oil purifier. Oil enters through inlet pipe, surrounds cartridge, flows through filtering medium (fullers earth or cellulose fibre as nature of contaminants demands), through felt covering of center tube, through a metal screen and finally into central tube, rising to top of outlet pipe, then downward to clean oil outlet. Maximum pump capacity on 24-cartridge purifier is 75 gallons per minute.

Oil filters are of many types and when used are almost always installed in connection with the equipment being lubricated. Such filters are generally used in the forced-feed lubricating systems of internal combustion engines regardless of the type of service. Gas, gasoline, tractor, and diesel engines fall in this category.

Oil filters under this heading are composed of housings in which removable elements or cells may be placed. When elements become partly clogged with oil contaminants, they can either be removed and cleaned or replaced with new elements, depending on type. Such an installation means simplicity in maintaining reasonably satisfactory oil performance. There is another type of oil filter composed of a housing and element in one unit. When this type becomes clogged, it is necessary to replace the whole assembly.



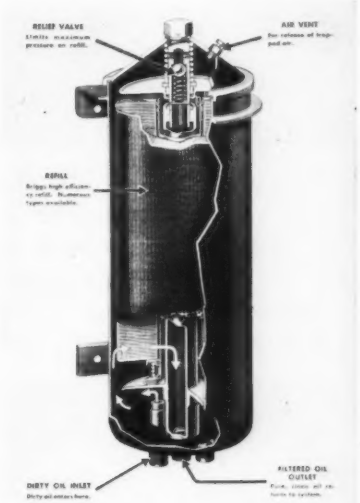
COURTESY OF BOWSER, INC., FORT WAYNE, IND.

Bowser Type B-1 is a small-batch filter with quart model self-measuring pump, for quarts, pints, and half pints for filtering steam and gas engine oils and oils from air compressors, small turbines, and drippings caught in pans about any plant. It settles, filters, stores, and provides a convenient means of filling oil cans with measured quantities of clean oil. Dirty oil is poured through the screened manhole and clean oil pumped out as desired.

Depending on the kind, oil filters are capable of removing insoluble oxidized material, foreign, mineral, and metal particles, carbonaceous matter, water and dirt, and in certain cases some soluble oxidation products. Oil filters will not separate mutually soluble liquids, such as diluent or fuel from lubricating oil. Types of oil filters may be classified as follows:

1. Metallic or mechanical (edge-type, copper-ribbon, steel-wool, screen, strainer). Filters of this type remove coarse contaminants such as metal chips and particles of grit and scale by means of closely woven metal screens. Removal of insoluble oxidized material generally is not effected unless the size of such particles is sufficiently large to be caught by the filter element openings. Soluble oxidized material, finely divided carbon particles, water, dust, and finer insoluble oxidation products cannot be removed by such filters.

2. Absorbent (cotton waste, wood pulp, wound yarn, felt, flannel, cloth, paper, mineral wool, quartz, diatoma-



COURTESY OF THE BRIGGS FILTRATION COMPANY, BETHESDA 14, MD.

Briggs filter and refill elements. Dirty oil under pressure is forced through the oil inlet connection into the filter and equally surrounds and enters the refill elements. Then the oil passes through the refill elements and is discharged out of the filter through the oil outlet connection. Oil that does not go through the refill elements passes through the relief valves.

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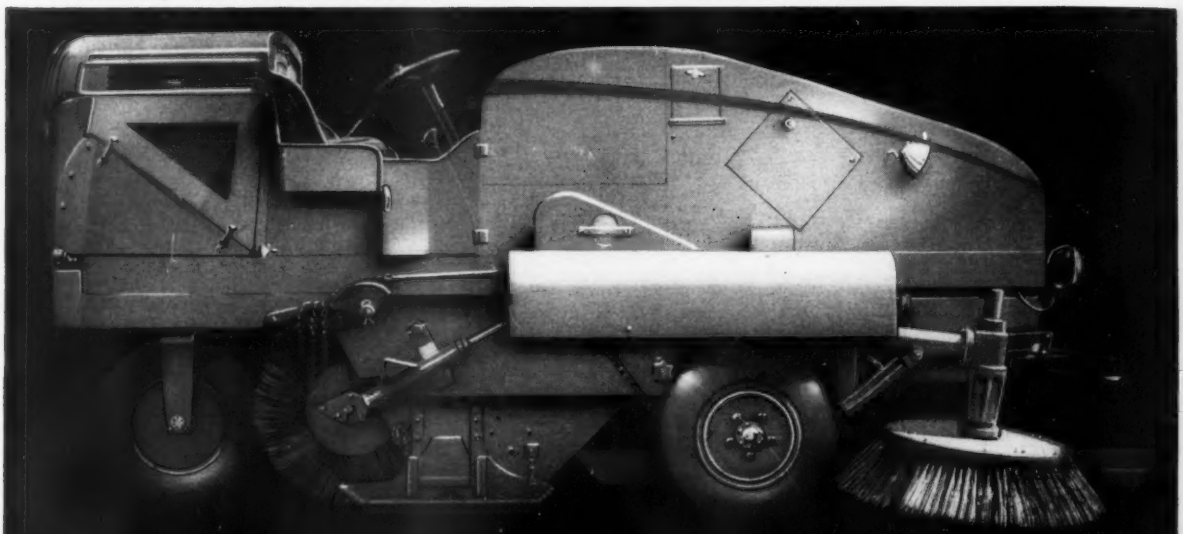

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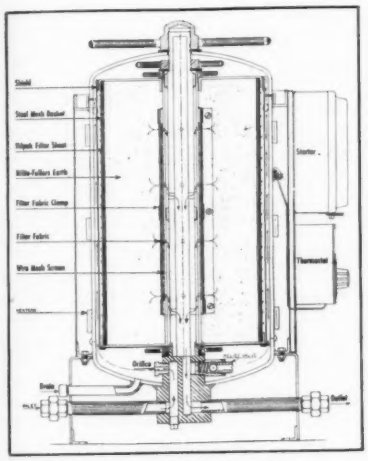
ceous earth, asbestos). Filters of this type not only remove coarse contaminants but also aid in the removal of finer insoluble particles such as carbon, dust, and insoluble oxidized material. Certain of these filters remove mineral acids as well as water. Soluble oxidation products are not removed. Filtration is accomplished by adhesion of contaminants to element structures, and absorption by the filter components.

3. Adsorbent (Fuller's earth, boneblack, charcoal, other active clays; chemically treated paper and waste). In addition to removing coarse and fine contaminants, filters of this type are capable of reducing the amounts of soluble oxidized material and water to a limited extent. Such filters remove oil contaminants not only by mechanical means, but also as a result of chemical action and adsorption. Adsorbent filters may remove chemical additives blended with certain oils to improve performance characteristics, but this is not true in all cases.

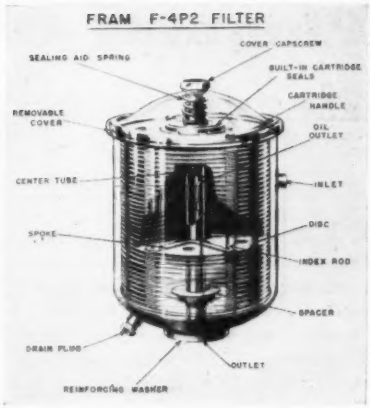


COURTESY OF THE HILLIARD CORPORATION, ELMIRA, N. Y.

Hilco Hyflow oil filters are used extensively for the purification of lubricating, fuel and many types of industrial oils. These units are equipped with or without heaters, as conditions require. Oil is delivered to the inlet by means of a four-speed pressure pump, and it is then forced through the filtering material, which may consist of fuller's earth for purifying straight-run mineral oil to remove all traces of solid matter and acids and for absorption of moisture. For the purification of compounded oils, a cellulose product being marketed under the trade name of Hiltex is recommended. After the oil passes through the bed of filtering material, it then passes out through the outlet back to the clean-oil storage or receiving tank. These units are available with single or multiple cartridges in sizes ranging from ½ gallon per minute up to 500 gallons per minute.

COURTESY OF THE FRAM CORPORATION, PROVIDENCE, R. I.

Fram Filcron Filters are for any type of diesel-gasoline or gas-engine lubricating oil. The flow is from outside in, thereby providing the greatest possible filtering area to the oil, thus increasing cartridge life. The replaceable cartridge is made up of stacked cellulose discs. This unique construction provides "micronic filtration" as the cartridge removes particles as small as one micron in size.



Oil filters may be installed in either of the following ways:

1. Full flow: One receiving total oil supply from pump discharge. Metallic or mechanical filters are generally used for this purpose.

2. By-pass: One receiving only a portion of the oil circulating in the system. Adsorbent and adsorbent-type filters are generally used for this purpose.

It should be pointed out that virtually all types of filters are equipped with means of by-passing the oil when filter clogging occurs. Oil filtration is almost always employed in conjunction with internal combustion engine installations and is also used to some extent in connection with other equipment. For instance, filters of the absorbent or adsorbent types are sometimes used to supplement methods of oil purification (batch or centrifuge) in turbine installations. Where large oil-storage facilities are available, metallic or mechanical filters are generally used in the lines between tanks and equipment to be lubricated. Oil filters may be used in any lubricating system where sufficient pressure is available to force the oil through the filtering medium.

This is the last of a series of three articles by Mr. Corrigan on this subject.

Recreation Programs Expand Greatly in 1946

LOCAL facilities, expenditures, and leadership for community recreation programs all took tremendous strides forward in 1946, according to the latest volume of the *Recreation Year Book*, published by the National Recreation Association. Facilities and services were reported by 1,530 municipalities, and more than 300 other cities not reporting are known to have had organized programs.

The total number of separate play centers, indoor and outdoor, increased from 17,320 in 1944, the year for which the last previous yearbook was published, to 26,185 in 1946. Children's playgrounds increased by 1,537. Increased service is reflected also by the report of 7,121 outdoor areas lighted for night use. Among the facilities reported are 11,847 tennis courts, 10,034 softball diamonds, 4,323 baseball diamonds, 3,138 ice skating areas, 2,333 athletic fields, 1,149 swiming pools, 618 bathing beaches, and 598 archery ranges. Youth centers, which mushroomed so rapidly during the war years, were reported as declining. In 1944, the only other year for which these special centers were included in the Year Book, the number reported was 1,813; in 1946, 1,659.

Local expenditures of $51,785,090 for 1946 were $13,000,000 greater than for 1944. Of this increase, $4,374,323 were in capital expenditures. In 1946, $8,012,517 were expended for improving existing facilities and acquiring, developing, and equipping new ones. Forty-six cities and one county reported the passage of recreation bond issues totaling $22,120,431 for the further expansion of the physical plant as soon as labor and materials are available.

Leadership, the key to successful recreation service, played a more important part than ever before. Employed leaders increased from 35,503 in 1944 to 41,159 in 1946; workers serving full-time the year round from 4,870 to 5,147. Expenditures for leadership were $19,862,869, or nearly 25% greater than reported for 1944. Further indication of the value which localities place on recreation leadership is shown by the fact that 45% of all current expenditures went for leadership. The value of volunteer service was also made clear. The number of volunteers increased nearly 40% over 1944.

Planning Objectives for Recreation Areas

IT is of the utmost importance that plans for the renovation and expansion of community recreation areas and facilities be sound, functional and effective, declares George D. Butler in the introduction to a new book,* *Recreation Areas, Their Design and Equipment,* prepared for the National Recreation Association.

"Every dollar spent for recreation areas and facilities," continues Mr. Butler, "should yield a maximum return in utility or beauty or both. . . . The preparation of plans involves a knowledge of local conditions and needs as well as an understanding of the principles underlying the design and operation of recreation areas."

According to the book, the following objectives should be considered by the person who designs a recreation area and by the officials responsible for approving the plan:

Effective use of the entire site. Since public recreation areas are seldom larger than needed, every part of the property should have a function which contributes to its utility, or its beauty, or both. The use of fences and hedges helps to achieve this objective.

Provision of essential areas and facilities. Major or primary features which make possible the activities that are in greatest demand are planned first; minor or incidental features receive secondary consideration in the allocation of space on the area.

Multiple use. Wherever practicable, features should be designed to provide varied forms of recreation at different hours or seasons, or for different age or occupational groups. For example, if tennis courts are also to be used for ice skating, they must be specifically designed and constructed for such use. Multiple use increases utility and is economical of space and funds.

Adequate space for the facilities. To assure satisfactory play, equipment, game courts, playing fields, and other features must be allotted ample space. Considerable privacy is desirable in areas used for such activities as picnicking and camping.

Ease of supervision or operation. Some types of recreation require constant supervision; others, little. This fact is important in determining their location in the area.

Facility of circulation and access. Planning should make it easy for persons who come to a recreation area to engage in or watch activities to reach the sections where these activities are carried on. Facilities for small children, for example, are located near the entrance. Properly located gates and paths enable persons to reach a grandstand or swimming pool without crossing areas used for active play, make various parts of the area accessible, and prevent interference with activities.

Utilization of natural features. A natural slope may be used to advantage for an outdoor theatre or for winter sports; a grove of trees for a picnic area or music grove, and a large level open area for an athletic field.

Safety. Careful arrangement of apparatus and game courts on the playground contributes to safety; on the large park or reservation this may be achieved by a proper location of roads and paths in relation to major features.

Economy in construction. Through careful planning, expensive operations such as grading and drainage may be reduced to a minimum, multiple use of facilities may be secured, and plumbing, surfacing, and other costs may be kept low.

Economy in maintenance. Maintenance costs often bear a direct relation to construction costs; a small addition to the latter through the use of better materials may result in a considerable saving in maintenance. Careful planning simplifies such operations as grass cutting, hedge trimming, cleaning of pools and buildings, and the care of game courts. Areas such as a bowling green should not be constructed unless adequate maintenance is assured.

Convenience of people using area. Frequently, an otherwise satisfactory area fails to provide adequately for the comfort and convenience of the people using it. Toilet facilities, drinking fountains, seating accommodations, and parking space are essential services. Orientation of game courts and fields and bleachers is exceedingly important in attaining this objective.

Appearance. Every recreation area should present a pleasing appearance from within and without, even though little space can be made available for plantings. Beauty may be achieved by means of architectural and landscape design.

* See page 171 of this issue.

New Satellite Town Financed

MORTGAGE insurance financing totaling $27,500,000 has been approved by the Federal Housing Administration for the construction of 3,010 rental homes by American Community Builders, Inc., the Chicago firm which intends to build a completely new and modern satellite city thirty miles south of Chicago's loop.*

Construction on the 2,400-acre site, located on the Cook-Will County Line between Chicago Heights and Matteson, will begin this month. The first houses will be completed early in 1948, according to present plans. Surveying for location of home sites and roads has already begun.

According to Philip M. Klutznick, president of American Community Builders and formerly commissioner of the Federal Public Housing Authority, the units covered by the FHA announcement include only the very beginning of a construction program which will eventually provide thousands of Chicago families with the necessary home comforts.

The rental development is the first step in our program to create a well-planned, thoroughly livable town (Mr. Klutznick commented). It is calculated to meet the current dire need for rental facility and at the same time to weave into the overall plan for the development of the community The sale of homes has been deferred until a later building program involving an additional four to five thousand dwellings. By that time, there will be less urgency for veterans' rental housing.

The rental section of the new town, which has been planned in detail by Loebl, Schlossman and Bennett, Chicago architectural firm associated with American Community Builders, will include 2,800 two- and three-bedroom units in multiple-family "town and country" houses and twin houses. Two hundred will be one-bedroom units. Designed to meet family needs, the architectural plans provide for a "tot-yard" for each fifteen to twenty homes. There will also be nine large surfaced and drained playgrounds with equipment and space for competitive sports.

The building organization will also offer a complete underground utility system, integrated shopping centers, and extensive public transportation facilities. Work on these projects will coincide with construction of the residential units.

* For further details about the planning of the project, see page 82, "New Satellite Town of 25,000 Planned," by Philip M. Klutznick, in THE AMERICAN CITY for January, 1947.

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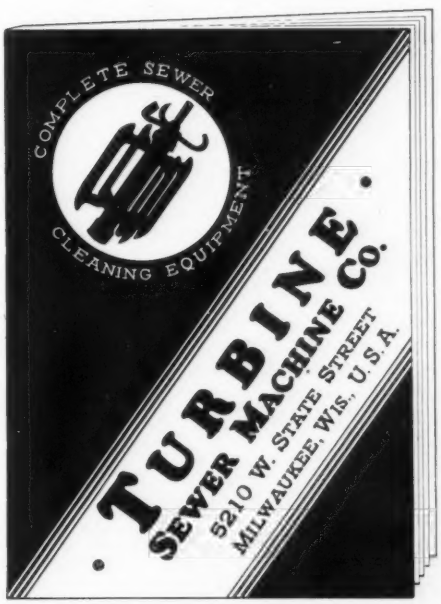

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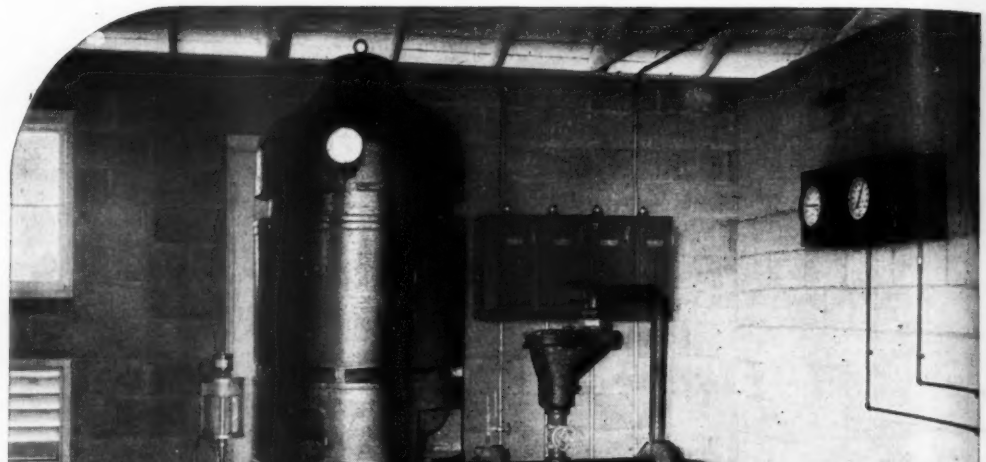

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They Bought Known Quality

Back in 1937, when the Peoples Water Service Company bought their first Layne Well Water System to serve the city of Warrington, Florida, they had only 263 connections. But Warrington, with improved water supply plus the attraction of being a fine home city, began a period of rapid growth. By 1941 a second unit was needed, and being guided by an appreciation of known quality, none but a Layne Well Water System was to be considered. In 1945, connections had increased to 3,200, so again additional water supply was needed.

Peoples Water Service Company now have their third Layne Water System . . . one of the finest and most complete in the entire state. Powered with a 100 h.p. electric motor, turning at 1170 r.p.m., this new system is producing 1150 gallons of water per minute from a well 290 feet deep. The well is underreamed and packed with 20 yards of sized gravel. The shutter screen is of silicon bronze, and the six stage pump is also of bronze.

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Sanitary Code Violations and Occupancy Permits

WISCONSIN. *Great Lakes Tanning Co.* v. *City of Milwaukee*, 26 North Western (2d) 152 (Wisconsin Supreme Court, February 25, 1947).

A provision of the Milwaukee Sanitary Code, in effect since before zoning, forbade tanneries to locate within four blocks from any public or parochial school, or where a majority of the buildings within a four-block radius are residential; but this section of the code had evidently been ignored for a long time, for all twelve tanneries in the city were located so as to violate its provisions. A tannery, without many of the usual offensive features, was planned in an area in Milwaukee zoned for heavy industry, but with a majority of residential structures within the prescribed radius. The Milwaukee Code forbade anyone to use any building without obtaining a certificate of occupancy stating that the proposed building conformed to the zoning scheme; and those permits expressly covered only the use of the premises, and not the right to run a business. After some expenditures had been made on this property, the Milwaukee building inspector revoked the permit, because of the Sanitary Code violation. The Tanning Company brought an action to enjoin the revocation.

The Court held that the building inspector's power to refuse permits was strictly limited by the requirements set out by the zoning ordinance, and that he could not use these permits as a means of enforcing other ordinances. It was expressly assumed that the zoning ordinance did not incorporate all previous regulations covering similar material. As the Court stated, the City has other means to enforce the Sanitary Code, and the judicial interpretation of the municipal regulations was probably technically correct. However, a system under which expensive litigation may force one city agency to issue a permit to do something, which another city agency is then in duty bound to forbid, does not commend itself as a very efficient mthod of public administration.

Conditional Acceptance of Park Land

NEW JERSEY. *Whipple* v. *Teaneck Township*, 52 Atlantic (2d) 44 (New Jersey Court of Errors and Appeals, March 20, 1947).

This case—the lower Court opinion was discussed in THE AMERICAN CITY for January 1947—involved the validity of the Township's acceptance of an elderly couple's gift of a 4-acre tract of land, for eventual use in a larger park development along the Hackensack River. The grantors made the gift subject to several conditions, including in particular a reservation of the right to use the land during their lives "without the obligation to pay any tax or taxes." When a taxpayer's suit challenged acceptance of the conveyance as a grant of tax exemption (which would admittedly be illegal), the lower Court upheld the grant by resorting to a peculiar distinction, that the Township was here itself assuming the tax liability rather than granting an exemption.

Accepting the same artificial concept, the highest New Jersey Court invalidated the grant on the theory that municipal assumption of the tax liability constituted a greater burden on the taxpayers than tax exemption would. While of course exemptions (at least on a large scale) may shift the burden and raise the tax rate a few points on other land, it is a little difficult to see how other taxpayers are so much *more* seriously overburdened when, as to 4 acres of vacant land, the Township shifts money from one pocket to the other instead of granting a straight exemption. However, the Court explained the whole point at length twice, perhaps because it was not a very good point. The whole distinction is of course highly fictitious, but one result emerges clearly: as a nearby newspaper put it the next day,

"Teaneck was out four acres of property this morning."

After the decision was announced, the local papers reported an interesting statement made by the victorious plaintiff, which illustrates the determined opposition in some quarters to the type of municipal development which was involved here.

"I am gratified to know that a municipal ordinance that fails to reveal all of the facts can be voided by our highest court, * * * I always felt that no real estate lying within the Township could be exempted from taxes by elected officials, but Messrs Votee, Deissler and Brett [the local commissioners] thought differently. * * * They voted for this ordinance, spent the people's money to defend it, and publicly acclaimed Mr. Andreas' deed of his property to the Township of Teaneck as a magnificent gift. * * * What Mr. Andreas needed was sound legal advice and less fanfare. * * * If it was the interest of Mr. Andreas and the Township Council to have Teaneck get the benefit of this transfer, it is a simple matter to determine from the mortality tables what the value of their interest is in the property, calculated upon an annual saving of the amount of their taxes."

Change of Farming Uses Permitted in Residential Zone

NEW JERSEY. *Stout* v. *Mitschele*, 52 Atlantic (2d) 422 (New Jersey Supreme Court, April 11, 1947).

A dairy business had been carried on on a 23-acre tract for many years and was now on the outskirts of an expanding town. While such a farming use was permitted under the Residential A zoning regulations, after 1936 the dairy continued as a non-conforming use, because it failed to fulfill the setback requirements adopted in that year. In 1943 the owners gradually discontinued their dairy business and turned to horse-raising; and the present case involved their application to build a barn for such horses.

The Court held that under the ordinance, horse-raising was permitted as "farming," quite as much as dairying. Moreover, the change in the type of farming was held not to destroy the right to continue the nonconforming use.

ZONING *and* PLANNING NOTES

Edited by
NORMAN WILLIAMS, JR.
with the assistance of
FRANK B. WILLIAMS
and
EDWARD M. BASSETT

County Zoning

TENNESSEE. *Davidson County* v. *Rogers*, 198 South Western (2d) 812 (Tennessee Supreme Court, January 11, 1947).

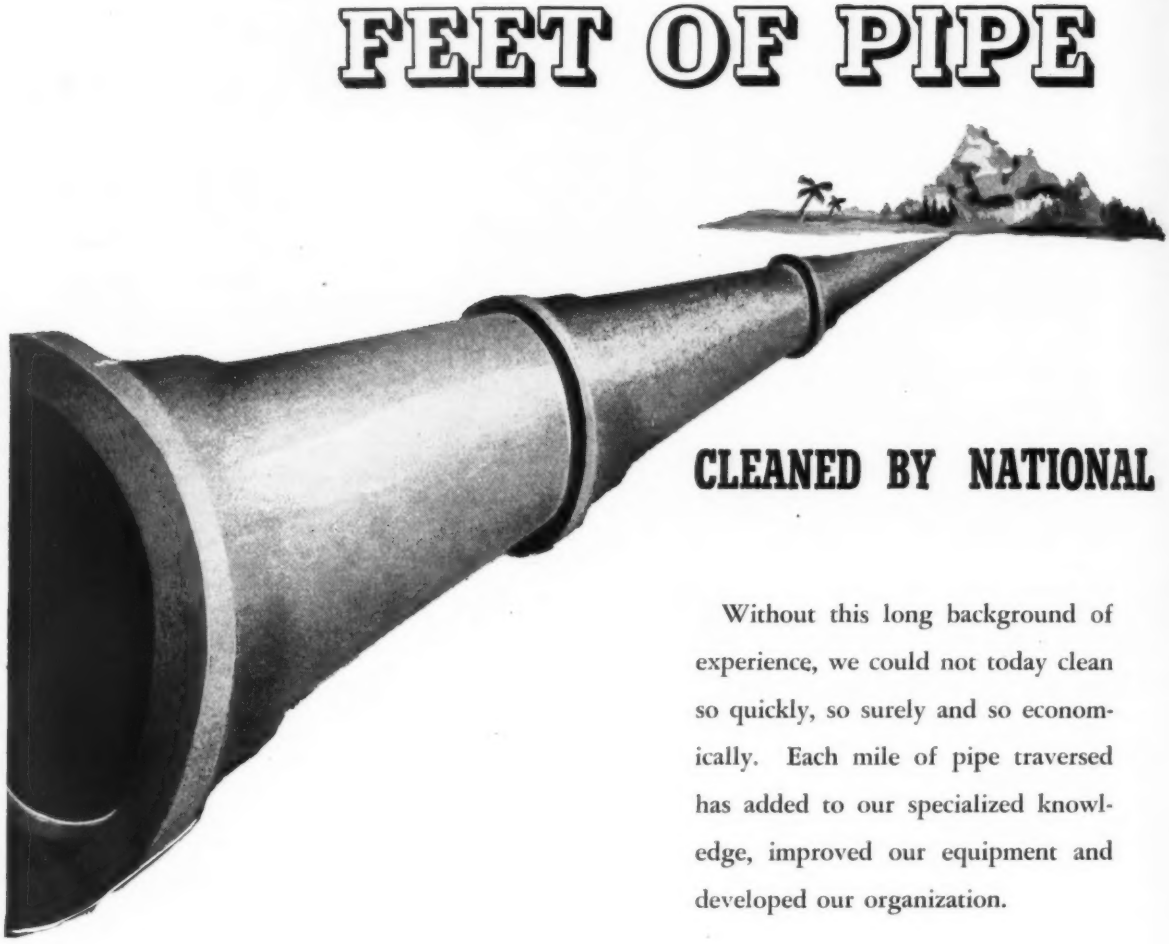
In 1939 an Enabling Act in Tennessee made provision for zoning, in areas outside the cities, by the County Court. Under this Act, a 1250-acre tract just outside of Nashville, and directly in the path of the city's suburban development, was rezoned from "unclassified," first for agricultural uses—a move which failed because of technical invalidity—and then to a residential C zone. The latter regulation was here challenged on constitutional grounds by the owner of some stone quarries within the area where their operation was now forbidden. After a long and very general discussion on the scope of judicial review, the Court held that there was sufficient reason for this zoning classification, and that the public welfare outweighed the losses to the quarry owners.

County Zoning—Domestic Animals

COLORADO. *Beszedes* v. *Board of Commissioners of Arapahoe County*, 178 Pacific (2d) 950 (Colorado Supreme Court, March 24, 1947).

In a comprehensive zoning resolution adopted for Arapahoe County in 1941, residential zoning regulations forbade keeping domestic animals; and, if a non-conforming use were discontinued for one year (except for repairs, etc.), it must thereafter conform to the zoning regulations. Since in this case the stipulation admitted that the new owners made no use of the barns on the property in question for livestock and poultry for a year, a non-conforming use for a cow, rabbits, and poultry was held to be now forbidden. The opinion also held that there were no facts here to justify an allegation that the zoning regulations were arbitrary and, therefore, unconstitutional.

36,960,000 FEET OF PIPE



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ATLANTA	1221 Mortgage Guarantee Building	MEMPHIS	822 Dermon Building	MONTREAL	2028 Union Avenue
BOSTON	115 Peterboro Street	OMAHA	3812 Castellar Street	WACO	P. O. Box 887
CHICAGO	205 West Wacker Drive	RICHMOND	210 East Franklin Street	WINNIPEG	576 Wall Street
HOUSTON	2518 Grant Street	ST. LOUIS	7103 Dale Avenue	Havana • Mayaguez • Puerto Rico • Bogota • Caracas • Mexico City	
KANSAS CITY	421 B.M.A. Building	SALT LAKE CITY	149-151 W. Second South Street		
LOS ANGELES	448 South Hill Street	SAN FRANCISCO	681 Market Street		

LEGAL NOTES *and* DECISIONS

Prepared by

NATIONAL INSTITUTE *of* MUNICIPAL LAW OFFICERS

CHARLES S. RHYNE
General Counsel

Annexation—Liability for Debts of Town Annexed

Where part of town was annexed to another town, held that debts of town annexed do not become charges against town to which territory is annexed. *City of Wauwatosa* v. *Union Free High School Dist. of Town and City of Wauwatosa*, 26 N. W. (2d) 535 (Wis., Apr. 8, 1947).

Assessments—Fraudulent Conduct—Copying Previous Assessments

In action to recover taxes paid, held that assessor's action in copying previous assessments on plaintiff's property was not in itself fraudulent conduct, although a more careful examination or reappraisal would have been preferable. *Moran* v. *Grosse Pointe Township*, 26 N. W. (2d) 763 (Mich., Apr. 8, 1947).

Bids—Necessity for Securing—Lease of Oceanside Boardwalk Premises by City

In certiorari to review resolution whereby certain boardwalk premises were leased to defendant, held that city must comply with advertisement requirements and award lease to highest responsible bidder, in absence of which resolution was required to be set aside. *Whirl-O-Ball, Inc.* v. *City of Asbury Park*, 52 Atl. (2d) 154 (N. J. Sup. Ct., Apr. 3, 1947).

City Employes—Increase in Wages as Creating Deficit—Duty of City to Meet Deficit

In action to enjoin issuance of budget notes to pay increased salaries authorized City of New York transportation workers, held that such increases amounted to deficiency in operation of transit system charging city with duty to meet deficit by issuing budget notes pursuant to resolution of Board of Estimate. *Wilmerding* v. *O'Dwyer*, 69 N. Y. S. (2d) 90 (N. Y. App. Div., Mar. 3, 1947).

Contracts—Water Bills—Payment of Percentage to Contractor—Debt Limitation

In action for accounting, held that a city contract by which constructor of water mains was to receive percentage of water receipts was not a debt within constitutional debt limitation provision. *Branigar* v. *Village of Riverdale*, 72 N. E. (2d) 201 (Ill., Mar. 19, 1947).

Fire—Liability of City for Causing—Insufficiency of Evidence

In action against city for damages caused by fire set to brush, held that evidence was insufficient to present question to jury of whether fires were started by city employes. *Foreman-Blades Lumber Co.* v. *Elizabeth City*, 41 S. E. (2d) 761 (N. C., Mar. 26, 1947).

Incorporation by Reference—Adoption of Another Act Not Unconstitutional

In action for assessment of privilege taxes, held that statute authorizing levy and adopting provisions of another act by reference is not unconstitutional because of failure to insert adopted act at length. *Corso* v. *City of Biloxi*, 29 So. (2d) 638 (Miss., Mar. 17, 1947).

Notice—Defective Waterworks System—Notice to Building Department Not Notice to City

In action for damages caused by leaking water system owned by city, held that notice to building department of city, in absence of duty to receive and report complaints to water department, did not constiute notice to city of defective condition of system. *Stein* v. *City of Newark*, 52 Atl. (2d) 66 (N. J., Cir. Ct. Essex Co., Mar. 7, 1947).

Intoxicating Liquor—Taxation of—Interstate Commerce—Temporary Halt in Transit

In action to recover personal property taxes paid on intoxicating liquor which had been shipped in interstate commerce, held that city could not tax such property where shipper had done everything possible to deliver goods to common carrier for removal to final destination and had not sold such goods locally, and where transit was temporarily interrupted. *Von Hamm-Young Company* v. *City and County of San Francisco*, 178 Pac. (2d) 745 (Cal., Mar. 14, 1947).

Nuisances—Rifle Ranges—Lawful Presence of Children—Injuries

In action for injuries, held that maintenance by city of rifle range, open to public, and on which a child, lawfully present, was injured, was a nuisance maintained in violation of statute. *Gaines* v. *Village of Wyoming*, 72 N. E. (2d) 369 (Ohio, Feb. 28, 1947).

Parks—Use of for Temporary Housing Project

In action to restrain use of public park as site for temporary housing site, held that such use was valid and not in violation of the city charter. *Griffith* v. *City of Los Angeles*, 178 Pac. (2d) 793 (Cal. App., Mar. 27, 1947).

Pensions—Nonavailability of Funds to Pay—Relief

In action for declaratory judgment, held that retired City of Cleveland police officer's remedy for nonavailability of funds with which to pay pension previously granted is by proper legislation, and not through strained interpretation of existing statute. *Stark* v. *Schneider*, 72 N. E. (2d) 118 (Ohio App., July 25, 1946).

Policemen—Liability of City for Alleged Torts of

Where policemen broke in door of premises, and placed third party in possession, held that city was not liable for alleged tortious acts of policemen, since officers were not furthering corporate interests of city. *Savage* v. *District of Columbia*, 52 Atl. (2d) 120 (D. C., Mar. 18, 1947). *Reh. den.* Mar. 31, 1947.

Public Funds—Day Care Centers for Children—Expenditures for Unlawful

In action to restrain further expenditure of funds by City of Cleveland for operation of day care centers for children of working mothers, held that such funds were not being used for public purposes where ability of parents to pay was not considered. *Ferrie* v. *Sweeney*, 72 N. E. (2d) 128 (Ohio App., June 26, 1946).

Sales Tax—Return of Share to Cities—Impairment of State Contractual Obligation

Where constitutional amendment provided for return of one cent of state sales tax to cities, held that such amendment does not impair obligation of contract of state by expenditure of funds appropriated by reliance on continued sales tax collection. *City of Jackson* v. *Nims*, 26 N. W. (2d) 569 (Mich., Apr. 8, 1947).

Sidewalks—Failure of City to Remove Snow—Liability

Where city failed to remove snow from sidewalk after 56 hours elapsed after snowfall, and city had cleared other portions of sidewalk, held that city was liable for damages resulting from fall on sidewalk. *Hofmann* v. *City of New York*, 69 N. Y. S. (2d) 125 (N. Y. App. Div., Apr. 3, 1947).

Parking Meters—Failure of City to Comply with Statute on Adoption of Measure Authorizing

Where City of Forest City failed to comply with statute authorizing installation of parking meters by not filing petition of voters invoking initiative on ordinance and where ordinance did not require vote of people, held that installation of parking meters could be enjoined on ground that ordinance was not in conformity with state statute. *Deaderick* v. *Parker*, 200 S. W. (2d) 787 (Ark., Mar. 31, 1947).

Solicitors—Requirement of Landowners or Occupants Consent Upheld

In action to restrain enforcement of ordinance regulating solicitors and peddlers, held that such ordinance prohibiting going upon private residences by solicitors and peddlers without consent of landowners or occupants was valid and within city's police powers. *Breard* v. *City of Alexandria*, 69 F. Supp. 722 (U. S. D. C. W. D. La., Feb. 12, 1947).

Taxation—Power of City to Grant Tax Exemption

Where city ordinance accepted deed reserving life estate in property to be used for park purposes without tax obligation, held that such action was *ultra vires* and void as creating illegal tax exemption. *Whipple* v. *Teaneck Township*, 52 Atl. (2d) 44 (N. J., Mar. 20, 1947).

Strict Anti-Smoke Laws Passed

Two of the most exacting anti-smoke ordinances in the country were adopted recently in Niagara Falls, N. Y., and Providence, R. I., according to the American Municipal Association.

Both cities have established strong air pollution control agencies and have given them broad powers under a single ordinance to regulate smoke, dust, and fumes. In many cities, each polluting element is handled under a separate ordinance as a nuisance.

"Trolley Coaches IDEAL To Reduce Traffic Congestion"

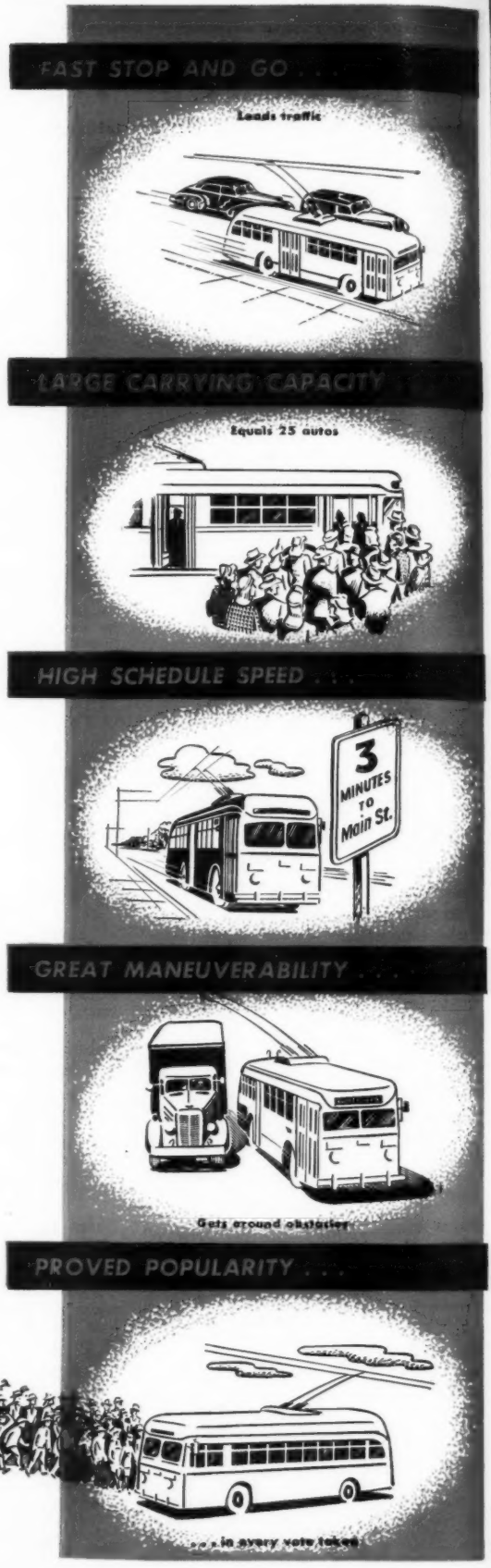
—says C. W. Gifford
one of the nation's foremost transit operators

"To reduce street congestion effectively, public-transit vehicles must be fast, big, reliable, maneuverable, and popular with the public," says C. W. Gifford, president of the Des Moines Railway. "That's why, without question, the trolley coach is the ideal vehicle."

Yes, trolley coaches meet the specifications a transit vehicle must have to reduce traffic congestion. Because they start and stop fast enough to keep pace with automobiles in city traffic, trolley coaches move ahead in any traffic lane. With its high schedule speed and large capacity, the average 44-passenger trolley coach can carry a load equivalent to that of 25 automobiles (based on the average automobile load of 1.75 passengers).

In every city where trolley coaches operate and public opinion has been polled, these smooth, clean, quiet electrics have won by a landslide. In Des Moines, for example, surveys, which cover eight years, indicate that trolley coaches are most popular.

Every public-transit rider uses one-seventh as much street space as an automobile passenger. That's why a higher transit riding habit in your city will greatly lessen traffic congestion and the parking problem. Why not make sure that more people will use public carriers regularly by encouraging your local-transit officials to modernize their service with the vehicles preferred by millions! *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*


FAST STOP AND GO . . .
Leads traffic
LARGE CARRYING CAPACITY . . .
Equals 25 autos
HIGH SCHEDULE SPEED . . .
3 MINUTES TO Main St.
GREAT MANEUVERABILITY . . .
Gets around obstacles
PROVED POPULARITY . . .
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See **LIFESTREAM OF THE CITY,** *the movie that shows how to minimize traffic congestion. Your G-E representative will arrange for a showing.*

GENERAL ELECTRIC

107-193

The Case Against Toll Roads

They are expensive to build and to operate and serve only a comparatively small segment of the population.

By THOMAS H. MacDONALD
Commissioner of Public Roads
Washington 25, D. C.

TOLL financing for the construction of highways is an inadvisable and expensive expedient. So far as we know, there is no existing toll road (except some short roads built to afford tourist access to mountain tops and coastal resorts) on which earnings have been sufficient to cover all costs of the undertaking.

Some use of the road is inevitably discouraged by the heavy charge exacted in toll. How heavy that charge may be would be appreciated if it were understood that a rate of one cent a mile payable for passenger automobiles —the rate depended upon in most of the proposals—is equivalent to a gasoline tax of 12 to 16 cents a gallon.

Limited Use

Another large fraction of the traffic that cannot use a toll road of the same location and design standard as a free road is made up of vehicles moving on trips of shorter lengths than the distances between toll gates. Entrance and exit are possible on a toll highway only at its gates. Every gate represents a substantial capital investment and continuing large operating expense in salaries of attendants, etc. Since the best that can be hoped for in nearly all toll facility proposals is a bare possibility of financial soundness, the number of gates must be kept at a minimum, their spacing at a maximum. In some of the present proposals the distance between access points averages as much as twenty-five miles. A prewar analysis of the lengths of highway trips extending out of cities in eleven representative states showed that the number of trips less than twenty miles in length varied from a minimum of 79% to a maximum of nearly 88% of the total number of all such trips in the several states. Trips less than ten miles in length varied from 56% to 70% of the total.

It follows, then, that apart from any consideration of the ability or willingness of travelers to pay the special charges imposed, no toll road can be expected to serve much of the traffic attempting to reach a free road in the same location. And this is true even if the so-called free road is designed as a controlled-access facility, because accesses to such a facility will invariably be spaced at much shorter intervals than is financially feasible on the toll road.

And here enters the most serious danger of the toll road. However great may be the remainder of traffic left to the parallel free road, however insistent may be the need for substantial improvement of the facility it affords to that traffic, the design standards of the free road must be held materially lower than those of the toll road, else the latter will be robbed of nearly all its essential support.

Moreover, to this proposition there is a corollary equally damaging to the theory of the toll expedient as an economic solution. That is that the toll road, in order to attract a barely sustaining traffic, must be designed to standards adequate for the accommodation of a traffic far greater than that which it can actually attract. The Pennsylvania Turnpike, for example, could serve with complete convenience a traffic of 12,000 vehicles a day. Its actual average traffic is between 3,000 and 4,000 vehicles a day, the bare minimum commonly considered essential to justify the construction of a four-lane divided highway.

But it is asserted that resorting to the toll expedient is the only way to get needed high quality facilities quickly; it is the only feasible way, it is said, to raise the necessarily large funds. Now, of course, the places where the most expensive roads are needed most quickly—namely, in or near cities—are the very places where it becomes utterly impracticable to employ the toll method.

Let Taxes Finance Roads

If capacity and facilities to be offered by any toll road are actually required, they can be provided more cheaply in a so-called free highway, even apart from the clear advantage of not having to maintain expensive toll collecting facilities.

Toll roads are built with borrowed money; nearly always with money borrowed by way of revenue bonds, which are predicated solely upon the problematical earnings of the roads themselves. Such bonds necessarily carry a relatively high rate of interest.

To revert to the argument that toll roads offer the only hope of immediate needed improvement—the implication is that, at a time when public highway authorities find it difficult to obtain at reasonable cost the materials, equipment, labor, engineers, and contractual services sadly needed for the correction of serious deficiencies in the public road system, the competing demand for these scarcities is going to be thrown upon the market. Scarcely a wise or a sound suggestion, I would say.

In the case of a toll bridge, this can be, and, for its financial success, invariably must be a monopoly. It has no free-bridge competition. Hence it exists as the complete and only facility serving a particular traffic stream. It should always be publicly owned and operated, and should be freed when its tolls have paid for it.

Source of Opposition

It generally appears that opposition to gas taxes and their increase arises from the petroleum industry rather than from the consumers of gasoline who actually pay the tax. Why this should be so is something of a mystery. We have looked long and hard to find evidence, if there be any, that a gasoline tax at any level thus far reached has had the least depressive effect upon the consumption of gasoline. We have found none. The tax is the ideal substitute for, and preventive of, toll financing. It is actually a form of indirect toll that has none of the defects of direct tolls. It has been the principal means by which the public has obtained the road service it now enjoys, and—make no mistake about it—the public even now enjoys good, if not the best attainable, road service.

Proof of DUAL ECONOMY!

DUAL Automatic Parking Meters set service records from Canada to California to Florida

IN scores of cities everywhere Duals stay on the job day in and day out. That's important—because it means Duals work *steadily.*

The reason Duals are such economical workers is they're engineered and built to quality standards. *Their meter movement—the most vital part of any meter—is manufactured by the makers of the famous Seth Thomas clocks.* The cast aluminum housing is weatherproof—is "air conditioned" to prevent moisture condensation. The meter setting works automatically—no levers to cause servicing problems. The coin compartment has a specially designed "pick-proof" lock. *Throughout,* Duals are expertly designed, ruggedly built, long-lasting.

Add up these advantages—they *prove* Dual economy. And, write for Bulletin DU-501 that gives complete information. Or, call upon our engineers for helpful service.

THE DUAL PARKING METER COMPANY

A subsidiary of The Union Metal Manufacturing Company

MILFORD BUILDING • CANTON 2, OHIO

Buses Banish Street Cars in Manhattan

BY now, all streetcar lines in New York's Borough of Manhattan have been motorized. One of the latest routes to change over was the ninety-four-year-old line along the Bowery and Third Ave. Seventy-five forty-four-passenger diesel hydraulic buses replace sixty-eight streetcars. The buses employ the new stop plan, with north-bound buses stopping at odd-numbered one-way streets and south-bound buses stopping at even-numbered one-way streets.

Old Trolleys Still Have Hey-day

ENJOYING a popularity they haven't experienced since the first World War, eleven streetcars in Vancouver, B. C., are becoming the center of a whirl of bids for a new lease on life as homes, diners, bunkhouses, and summer camps. Three were sold in January of this year, and eight more are being dismantled to be put on the auction block soon.

Twenty Transit Companies Help Cut Accident Toll

FOR outstanding success in the safe operation of their vehicles during 1946, twenty transit companies received the annual American Transit Safety awards presented by Wallace Falvey, President of the American Museum of Safety. These awards were made on the basis of collision accidents per 100,000 miles of operation, and passenger accidents per 1,000,000 passengers carried. More than 120 companies participated in the 1946 competition. Among those honored were the Department of Street Railways, Detroit, Mich., and the Milwaukee Electric Railway & Transport Company.

A City Within A City

AS in most American cities, the principal shopping districts of St. Louis, Mo., are congested and widely scattered. This situation handicaps the shoppers, most of whom do not live in the center of the city, and must return home on a bus or street car, burdened with packages.

Hampton Village, America's largest drive-in shopping center, now being built near the residential districts by a group of St. Louis business men, will help to solve this problem. Eighty percent of St. Louis' purchasers live within ten minutes of Hampton Village. This $11,000,000 development, its area equivalent to fifteen downtown square blocks, will provide parking for about 2,500 cars.

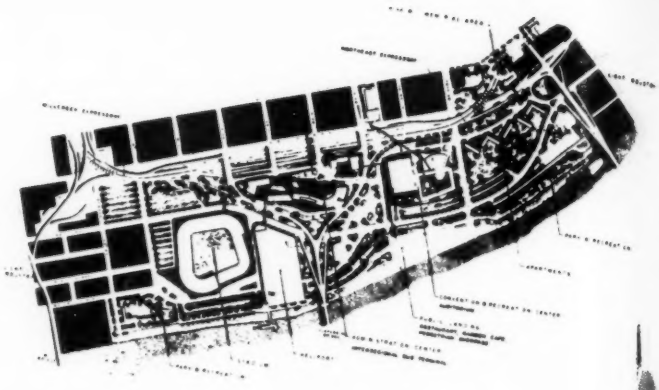
Now, when Mrs. St. Louis goes shopping, she will find an attractive, compact center, complete with numerous types of stores, doctors' and dentists' offices, a library, a lecture room, restaurants, and movies. Within a few steps is her car, where she can deposit packages at her leisure and, when finished shopping, she can ride home comfortably. This removal of shoppers from the center of St. Louis will not only make the shopper happy, but will also relieve both traffic and pedestrian congestion in the downtown area, providing a steady flow for the main through traffic.

Transit Lines Travel Eighteen Round Trips to the Sun

THE nation's transit lines last year operated the equivalent of more than eighteen round trips to the sun, or 3.3 billion miles, to give everyone in an urban area an average of 282 transit rides. This information was supplied by the American Transit Association. Another interesting fact was that a record total of almost 23½ billion passengers paid $1,397,100,000 in fares, and that of this sum exactly half was returned in wages and salaries to the quarter million employes on the transit payrolls.

Motor Scooter Used to Collect Coins

Wilmington, Del., uses a Cushman Motor Scooter for collecting coins from the 440 Dual parking meters in that city. According to Fred Brown, the collector, the scooter has changed his job from a tiresome, arduous task to its present, pleasant schedule, saving time and exertion. The parking meter coins will be counted by an Abbott electric coin counter, which is another conservation of man-power and time.



Cheat *death* when you plan

The great City Planners and Traffic Engineers of *today* are the *life savers* of tomorrow.

They are choosing the PRISMO LIFE LINE, because to them it means:

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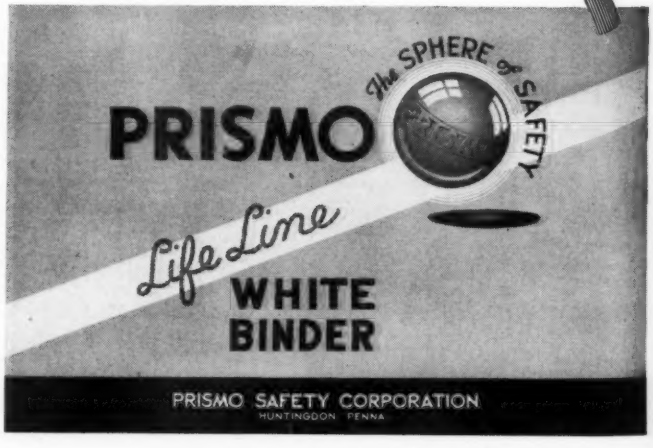
The most in visibility
The most in durability
The most in economy

•

PRISMO LIFELINE is the *modern* reflective material for highway, road and street markings. Prismo is standard in many states, cities and counties for all danger points, including no-passing zones, fog-lining and municipal marking. PRISMO—*guides by day . . . protects by night.*

Look for this label when you plan*



*Write for Bulletin 461 (Prismo Life Line) and for Bulletin 547 (Prismo Sign Kit).

Wichita's A-Plus Traffic Record

WICHITA'S excellent traffic record is exemplified by the fact that from 1941 through 1946 it has won first place in Kansas' traffic-safety contests, not to mention prizes in the national traffic-safety contest. New safety programs are being put into effect continuously or are placed upon the agenda for discussion.

Among the projected programs for bettering safety standards are repainting pedestrian safety islands, widening and rerouting U. S. Highway 54, replacing old street-name signs, improving the street lighting, and keeping centerline and lane-line markings freshly painted. The police department is planning to equip all patrol cars with Miro-Flares, red reflector-type warning signals, to be used at the scenes of night accidents.

Elimination of Antiquated Street Signs and Lights

Until this year, most of the street-name assemblies were of the old type, with 2½-inch letters on a 3-inch panel. The sign was legible to the motorist only after he had passed through the intersection. The city is installing modern four-way street-name assemblies manufactured by Miro-Flex Company, Inc., Wichita. They carry 4-inch letters, embossed on a panel 6 inches deep; are easily legible, and can be seen by the motorist as he approaches the intersection from any direction.

One of Wichita's new four-way signs.

New gooseneck standard street lights, with 120-candlepower bulbs, also are being installed in the areas not properly lighted. More than 120 of the new street lights have been installed, and the rest will be forthcoming as materials are available.

Proof of the Pudding

Wichita has sixty-one signalized intersections, 5,000 traffic signs, 200 white-way poles, and, when the street-name assembly program is completed, more than 12,000 street-name signs. Wichita's excellent traffic record is as follows:

1932—First place, national traffic safety, in its population group.
1938—Honorable mention in national traffic safety contest, in its population group.
1941—First place, Kansas traffic safety.
1942—First place, Kansas traffic safety.
1943—First place, Kansas traffic safety. First place, national traffic safety, in its population group.
1944—First place, Kansas traffic safety. Honorable mention in national traffic safety contest, in its population group.
1945—First place, Kansas traffic safety. Grand award, national traffic safety, cities of all classes. First place, national traffic safety, in its population group. First place, national pedestrian protection, in its population group.
1946—First place, Kansas traffic safety. Second place, national traffic safety, in its population group.

Traffic fatalities have dropped from twenty-two in 1929 and twenty-nine in 1930 to seven in 1945 and eight in 1946. During the past nine months, only one traffic fatality has occurred in the city of Wichita.

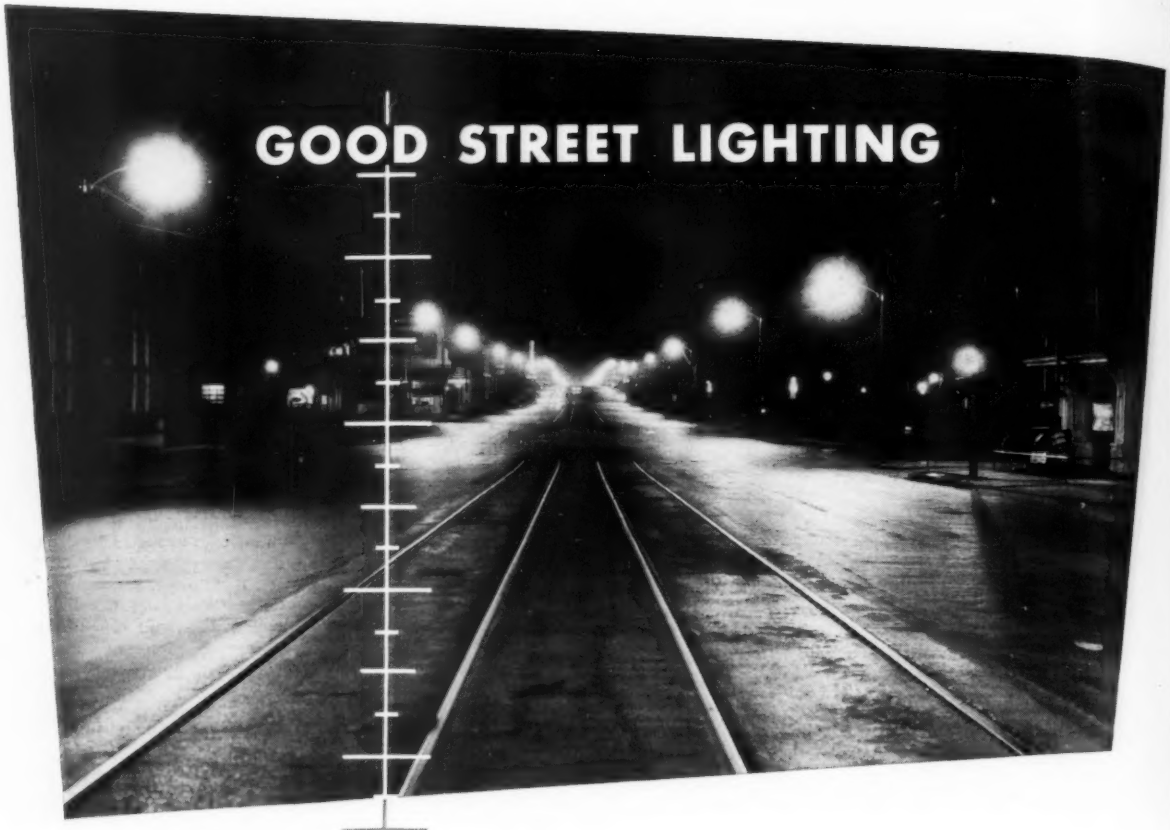
The record during the first six months of 1947, with the new traffic safety plan in progress, should prove interesting.

Sixty Seconds Cost Overtime Parkers One Dollar

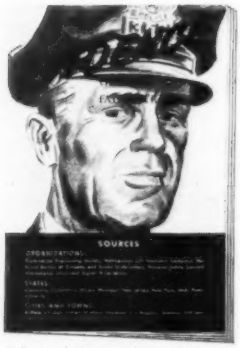
OVERTIME parkers in Chillicothe, Mo., are given one more chance to make good. A parking meter has been installed in front of the police station especially for those overtime parkers who appear at the station within an hour's time of receiving the ticket. They can deposit their nickel and go merrily on their way. But if they wait sixty-one minutes, the regular fine of one dollar is imposed.

New San Francisco Coaches

Mayor Roger D. Lapham of San Francisco, Calif., welcomes delivery of the first of forty-four-passenger dual engine Twin Coaches, capable of operating on his city's steepest hills. To introduce the new coaches, the city invited the public to ride free of charge for two days.



A civic benefit you can measure



Ideas, information and case histories that you can use in promoting traffic safety in your community are available from your local electric utility—and in the new, factual book "Evidence", published by The Street & Traffic Safety Lighting Bureau, 155 E. 44th Street, New York City.

...in improved Real Estate Values

THE next time you see good street lighting, note how it improves the appearance of business and residential districts.

The entire area gets a "lift"—is more attractive—business is stimulated. And it's no secret that increased business traffic helps boost real estate values.

There's another factor, too. Citizens voice their appreciation of modern traffic safety lighting. Letters to editors, to local governments, to electric utility companies, show that people prefer a *well-lighted* community to a *dark* one—that they feel more secure.

It's almost axiomatic that good street lighting and better living go hand-in-hand. Other benefits include reduced crime, fewer traffic fatalities, lower accident costs and increased civic pride.

GOOD STREET LIGHTING
THE SIGN OF A GOOD PLACE TO *LIVE*

Modern Floodlighting...

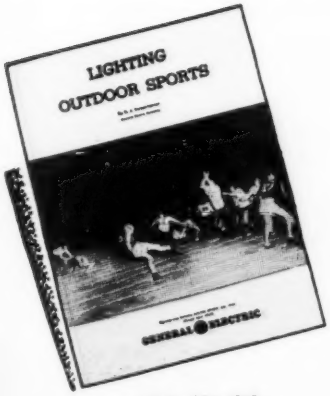
CAN MAKE YOUR RECREATIONAL FUNDS

twice as Useful!

The best way to make an investment in recreational facilities pay off in full is to provide modern floodlighting. Under lights, tennis courts, soft-ball fields, swimming pools and other facilities can become twice as useful—at an increase in cost that is surprisingly small compared to the original investment.

Modern lighting—with floodlights designed especially for sports lighting, and installed according to standard, experience-tested layouts—is far beyond the experimental stage. Adequate light can be provided for any sport—from croquet to big-league baseball. It is acceptable to players and spectators alike. It is inexpensive in power consumption, economical to maintain.

Our lighting specialists and agents will be glad to work with you in lighting—or designing for lighting—any park, recreational or sports areas. Meanwhile, may we send you "Lighting Outdoor Sports," an 8-page bulletin containing a number of suggestions on how to get maximum effectiveness from floodlighting. Just ask for GEA-4509—address your nearest G-E, agent, apparatus office, or *General Electric Company, Schenectady 5, N. Y.*



Ask for GEA-4509

GENERAL ELECTRIC

Westinghouse Universal Hood

★ 8 conversion plates, top mounting and side mounting
★ adapter for any type reflector

. . . the answer to system standardization

One hood for all applications—gives the most practical equipment for providing up-to-the-minute lighting, now—and for years to come—without discarding expensive equipment. More than 1,500 combinations are positive proof of its vital contribution to standardization of your street lighting system.

J-04123

Check these Combinations...

ELECTRICALLY—High-voltage series receptacle, for 5,000 volts. Straight series circuits, either 6.6 or 20 amperes.

Low-voltage series receptacle for series circuits of 2,500 volts or less, either 6.6 or 20 amperes; straight series or on secondary of isolating transformers.

Mogul multiple sockets for multiple circuits.

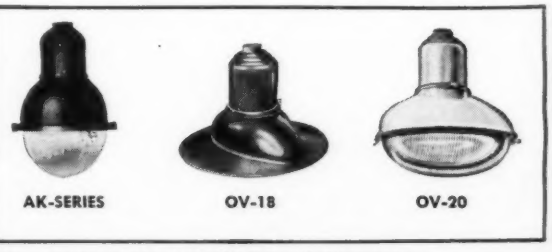
MOUNTING—Top mounting, either 1¼″ or 2″.
Side mounting; slip fitted for either 1¼″ or 2″.
Side mounting with heat barrier bushing.

WIRING—Inner wired through bracket.
Inner wired through heat barrier bushing.
Externally wired: through high-voltage porcelain bushing
through low-voltage (multiple) porcelain bushing
external terminals for high voltage
external terminals for low voltage (multiple)
packing glands (single gland for duplex cable)
(2 glands for single conductor)

OPTICAL SYSTEMS—Open shielding type OV-18 reflector, for 1,000 or 2,500 lumen, 5⅜″ L.C. lamps.
Enclosed units—Type AK 10; OV-20.

LIGHT DISTRIBUTION—(from optical system)—
OV-18, asymmetric
AK-10 (I.E.S. Types I, IA, II, III, IV, V)
OV-20 (I.E.S. Types II, IV)

LAMPS—Incandescent series, 1,000 to 15,000 lumen inclusive.
Multiple 150 to 750 watts.



AK-SERIES OV-18 OV-20

AVAILABLE THROUGH 127 WESTINGHOUSE ELECTRIC SUPPLY OFFICES AND INDEPENDENT DISTRIBUTORS.

New Street Lighting Program For Highland Park

Connecticut Avenue's two-way light distribution.

By E. H. RICHTER
Municipal Lighting Engineer
Detroit Edison Company
Detroit, Mich.

PROGRESSIVE municipal officials of Highland Park, Mich., recently embarked on a four-year program to relight all the city's streets. The first step was a demonstration system on Connecticut Avenue, which has attracted widespread interest ever since its completion. Its attractive daytime appearance plus the greatly improved visibility is in grateful contrast to the lighting system in vogue thirty years ago.

The demonstration installation has two luminaires on the same side of the street in each block. The poles are spaced from 270 to 370 feet apart, depending upon the length of the block. A 6,000-lumen incandescent lamp mounted at a height of 25 feet and extending 15 feet over the curb provides the illumination. The General Electric luminaire with verti-lateral refractor provides two-way (up and down the street) light distribution. This makes possible the long spacing between poles while still providing the light intensity specified by the IES Code.

Because of the amount of foliage on Connecticut Avenue, special emphasis was placed on the fact that the light source should be over the center of the street. A 15-foot bracket is now used.

Extra-long brackets clear foliage.

The old street lighting system on Connecticut Avenue consisted of one upright ornamental luminaire, with a 2,500-lumen lamp in the center of each block, and one upright ornamental luminaire with a 10,000-lumen lamp at each intersection. Mounting heights were only 12 and 15 feet and the spacing between luminaires about 500 feet. In the new system, the intersection lighting is provided by the units on the major intersecting thoroughfares.

New Lights Reduce Hazards

The undirected light furnished by the old system was wasteful, whereas the new system provides more light distributed more efficiently. The net result is a reduction in the hazards of night driving and walking and greater protection against robberies and burglaries in the neighborhood.

With the demonstration installation in practice less than a year, we already have received requests for 100 similar units to be installed on residential streets. We expect to install 500 additional units within the next few years.

This EXTRA Warning Saves Lives!

CROUSE-HINDS

flashing beacon with an illuminated sign acts like a **powerful brake** that **slows down** traffic approaching dangerous intersections

This compelling beacon serves a double purpose, it warns that there is a signal ahead and it also serves to put the motorist on the alert. An alert driver is seldom involved in an accident.

There are dangerous intersections in every signalized area where there is a definite need for the advance warning that this signal gives. Typical examples are: an intersection where the approach is around a curve or over the crest of a hill; where high speed main arteries are crossed by secondary roads; where main highways pass through small villages; and where main highways enter suburban or urban communities. It is especially important to have an advance warning beacon if there is a confused background of red advertising signs at the intersection.

Go over the intersections in your area and check the ones where this Crouse-Hinds warning beacon should be installed to reduce accident hazards and save lives. In this way you can prevent the tragedies that are caused by the driver who "didn't see the signal in time to stop".

Write for additional information.

Type TST111D
Flashing Beacon with an Illuminated Sign

You can use any information or warning sign — continuously lighted by a lamp in the reflector on the base of the beacon

Crouse-Hinds Catalog 226 lists a complete line of traffic signals, beacons, flashers, and a series of controllers designed to help you solve your traffic control problems — from simple installations up to the most complex heavy traffic problem. Send for your copy.

A Nationwide Distribution Through Electrical Wholesalers

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Offices: Birmingham – Boston – Buffalo – Chicago – Cincinnati – Cleveland – Dallas – Denver – Detroit – Houston – Indianapolis – Kansas City – Los Angeles – Milwaukee – Minneapolis New York – Philadelphia – Pittsburgh – Portland, Ore. – San Francisco – Seattle – St. Louis – Washington. *Resident Representatives:* Albany – Atlanta – Charlotte – New Orleans – Richmond, Va. CROUSE-HINDS COMPANY OF CANADA, LTD., *Main Office and Plant:* TORONTO, ONT.

CONDULETS · TRAFFIC SIGNALS · AIRPORT LIGHTING · FLOODLIGHTS

Lighting for the Small Airport

By LESLIE C. VIPOND
Chief, Lighting Division
Airport Engineering Service
Civil Aeronautics Administration

This elevated light unit is recommended for runways and strips in place of flush lights. The unit consists of a light mounted on a cone painted yellow and is made by American Gas Accumulator (AGA), Elizabeth 3, N. J.

LAST fall, Hybla Valley Airport, a small privately owned field near Alexandria, Va., felt the limitations brought on by lack of lighting. The management was forced to stop all flying activity when darkness came and, with wartime daylight savings time discontinued, it meant the loss of another daylight hour. Beginner flyers were displeased to find that there was no time for lessons after office hours.

The solution to the problem was the installation of airport lighting equipment. The management knew that an airport lighting system, which would meet Civil Aeronautics Administration minimum standards, would be expensive. Nevertheless they installed equipment for one runway on an experimental basis. The change in the schedule of activities at the airport did not become apparent overnight, but it did take place. The operators, the instructors, and the would-be flyers had to adjust to the idea at first. Navigation lights, landing lights, and flares had to be installed on some aircraft. In a short time, night-business increased, and a genuine enthusiasm for night flying developed. One student, who took his instruction after office hours, was soloed at night without having had any daylight flying hours.

After five months, night flying had increased the airport's revenue by $2,000. Of this, approximately $800 was received in January for night flying. The Hybla Valley management is now purchasing additional airport lighting equipment for two more runways, plus additional obstruction lights and a new beacon.

The trend in airport construction is toward landing strips, rather than the development of "all-way" fields. This type of small-field construction is, of course, less expensive. Two or more landing strips per airport are normally constructed in the prevailing wind directions to give maximum wind coverage. Where traffic warrants it, and where funds are available, paved runways are built in the center of the landing strips.

Runway Lighting Best

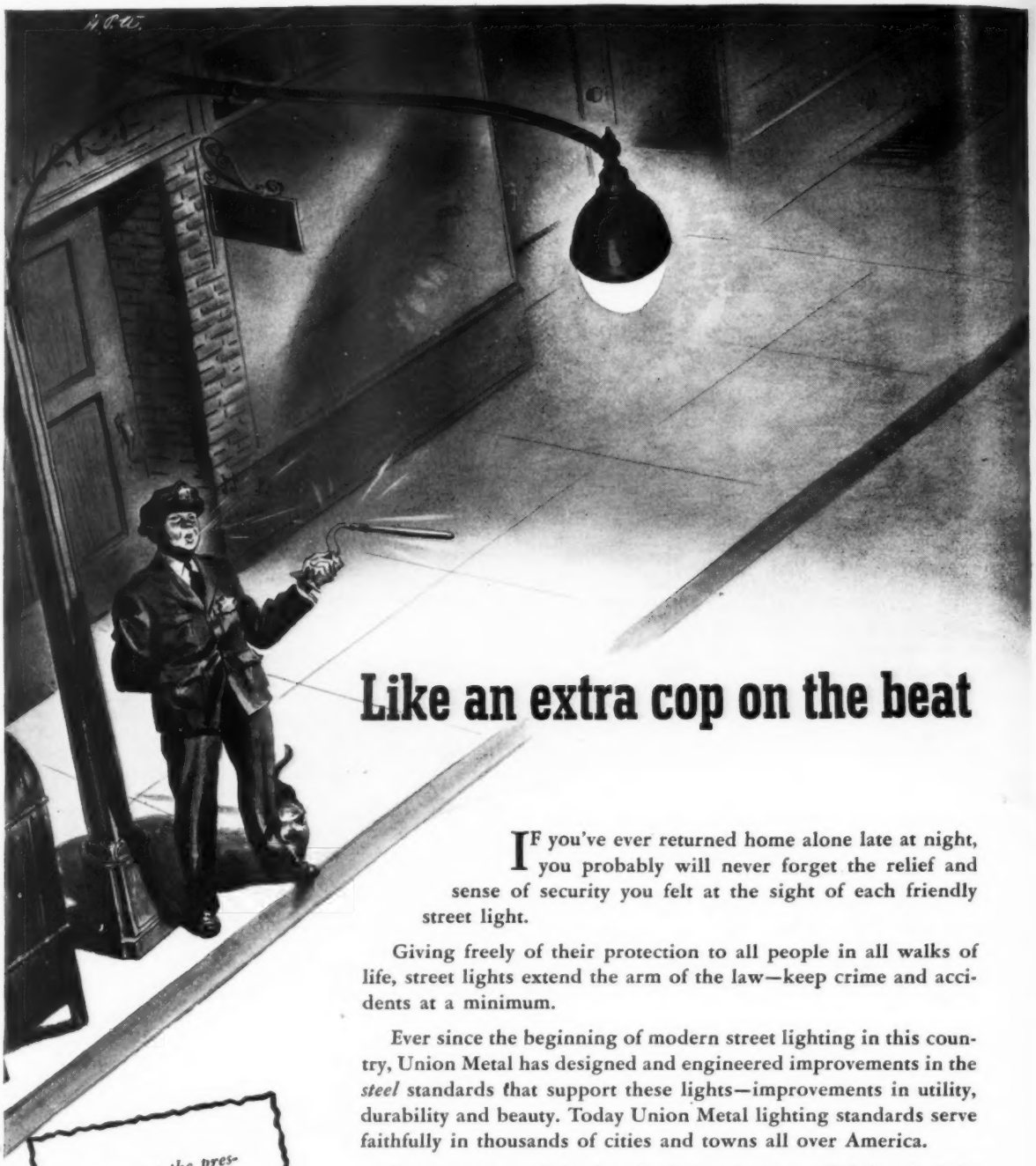
The landing-strip type of airport lends itself well to the most modern kind of lighting. This consists of two parallel rows of clear lights near the edges of a runway or preferred landing path, with green threshold lights marking the ends. It is a tremendous improvement over the old practice of lighting only the perimeter of an all-way field with comparatively low-candlepower boundary lights. The two parallel rows of runway lights—between which the plane lands and takes off—provide the important element of perspective and depth perception for the incoming pilot. The two rows of lights also give adequate attitude and altitude reference. By completely outlining the runway or landing path, they provide a quick means of reference for planes approaching to land. The runway type of lighting avoids the feeling of "landing blindly in a box" which has been said of landings made at night in an all-way field, lighted only by lights at the perimeter.

For locating lights along paved runways the Civil Aeronautics Administration has issued Technical Standard Order No. TSO-NI, dated October 4, 1946, under the title *Civil Aeronautics Administration Uniform Requirements for Runway Lighting.* This Technical Standard Order TSO-NI has this to say regarding the location of elevated runway lights (recommended in lieu of flush lights):

The elevated runway lights shall be located in rows in each side of the runway, parallel to the runway centerline and not less than 10 feet out from the paved width of the runway primarily intended for landing or take off of aircraft, regardless of the width of the paving. The longitudinal spacing of lights in the rows shall be as close to 200 feet as practicable. The spacing on both sides of the runway shall be begun so that the lights are symmetrically arranged in pairs on opposite sides. . . .

For threshold indication, the elevated lights shall be placed at each end of the runway along a line perpendicular to the runway centerline extended and not less than 10 feet in the approach direction from any part of the paving at the runway end. The outermost light on each side shall be in line with the runway lights. Additional lights shall be placed between these outermost lights, leaving an 80-foot clearance gap at the center of the runway. The threshold lights shall be symmetrically spaced in two groups, one on each side of the clearance gap, using a total of six units for runways with runway-light rows 220 feet or less apart, and eight units for runways with runway-light rows over 220 feet apart.

If the small airport your community is planning to build will not have paved runways, you must decide whether you want the lights located along the edges of the strips or moved in to mark the center portion of the strip. At a recent conference of Regional Lighting Engineers of the Civil Aeronautics Administration Airport Engineering Service, the recommendation was made that on strips at small airports the center portion be marked with two parallel rows of lights placed approximately 150 feet apart. This arrangement will achieve maximum benefit from the lighting system and will help separate the traffic into safe operating areas. The normal use of the unpaved landing strips is for planes to land and take off down the center portion and taxi along



Like an extra cop on the beat

IF you've ever returned home alone late at night, you probably will never forget the relief and sense of security you felt at the sight of each friendly street light.

Giving freely of their protection to all people in all walks of life, street lights extend the arm of the law—keep crime and accidents at a minimum.

Ever since the beginning of modern street lighting in this country, Union Metal has designed and engineered improvements in the *steel* standards that support these lights—improvements in utility, durability and beauty. Today Union Metal lighting standards serve faithfully in thousands of cities and towns all over America.

In your community's plans for improving street lighting, include Union Metal *steel* lighting standards. You and your fellow citizens will find they have *many* benefits—not the least of which is their efficiency. The Union Metal Manufacturing Co., Canton 5, Ohio.

We regret the present extended delivery schedules due to the steel shortage, but this will improve and you will find Union Metal lighting standards well worth waiting for.

UNION METAL

Largest Producers of Street Lighting Standards

the sides. By marking the center portion with two rows of lights, it is expected that the safety of operations will be definitely increased by providing more positive separation of the landing and take-off traffic from the taxying traffic going in the opposite direction. This traffic separation will be good for both day and night use, since the type of light recommended will be equipped with a highly conspicuous, bright yellow cone.

The elevated lights mentioned as recommended for use on small airports are the recently developed elevated strip and runway marker lights, which conform to the Civil Aeronautics Administration, Office of Airports, Specification L-802. These units consist of a light mounted on a small metal cone painted bright chrome-yellow for day marking purposes. The light is surrounded by a glass or plastic optical-globe designed to concentrate the light up and down the runway or strip. Specification L-802 calls for a minimum of 1,000 candlepower in the main beams, which is ten times that required for the older type boundary-perimeter light units. The yellow cone may either be mounted directly on the ground by three stakes, or it may be mounted on a central, thin-wall, conduit pipe at a height not to exceed 30 inches from ground level to the top of the globe. The column must include a breakable coupling at ground level which, if the unit is struck by a blow of two foot-pounds or more, will break cleanly and allow the whole unit to come unplugged from its below-ground supply circuit and roll out of harm's way.

Flush Lights Obsolete

Elevated lights are recommended for runways and strips in place of flush lights. Flush-type lights have proved difficult to maintain under operating conditions. They leak water and, with exposed current carrying parts below ground level, the whole underground circuit is likely to be "shorted out" at any time. No cure has been found for this without increasing their construction and maintenance costs.

The elevated light is free from this trouble, since its socket connections are well above the ground line. The use of insulating transformers at each elevated light keeps the underground supply circuit isolated below ground at its full length, and keeps it free from danger of grounding out.

The flush units are easily obscured by grass, dirt, and weeds. Maintenance experience has been particularly bitter on this score. The light comes out of the flush unit at such a low angle that it takes only a 3-inch- or 4-inch-high clump of grass or weeds, or a clod of dirt, to obscure a beam. It is not feasible to keep grass and weeds cut that low. A little wind can blow enough dirt against the lens to cut the light output by more than half. Snow and ice also have been a problem. A few inches of snow will put the lights out, unless a crew is kept on the field to sweep the lights clear. Often when an attempt is made to plow the snow off the covered flush lights, the snow plows have a habit of shearing off large numbers of complete head assemblies of the units. If water from melted snow and rain is allowed to collect around the lights at northern airports in winter months, the result is ice that cuts down the light output to the vanishing point, and even breaks the lenses. On the other hand, the elevated lights, with their lamp and lens assembles at a height of from 12 to 30 inches above ground, avoid such troubles.

At least five manufacturers are preparing to make small airport marker lights designed to conform to Specification L-802. Such units are planned for lighting installations at small airports under the new Federal Aid Airport Program. Some manufacturers are planning to market the units as part of a *packaged* airport lighting system. The *package* will include the marker lights, threshold lights, obstruction lights, lighted wind cone, cable cut in the proper lengths ready for splicing or plugging in (if equipped with molded on plugs), insulating transformers, a transformer or regulator power supply in a cabinet with control panel on top, an airport rotating beacon, and necessary accessory equipment. With this type of packaged runway lighting, the installation is extremely easy. Where more than one runway or landing strip is to be lighted, additional "packages" can be purchased which do not include the beacon, power supply, and control panel. These items are not needed for lighting a second or third runway or landing strip. In some cases the lighted wind cone and rotating beacon are not included as part of the package.

The idea of *packaged* lighting systems for small airports is chiefly a marketing problem of the manufacturers of airport lighting equipment. The idea should save the user a certain amount of engineering time and expense. Several manufacturers are advertising that their packaged lighting system can be purchased for as low as $1.00 to $1.50 per linear foot of runway or strip. For this price, lighting equipment for a 3,000-foot runway or strip would cost $3,000 to $4,500. This includes the runway or strip-marker lights, the threshold lights, the necessary cable, and the power supply cabinet with control panel on top. The beacon, obstruction lights, and illuminated wind cone are usually sold separately. It is also pointed out that the magic figure of $1.00 to $1.50 per foot does not include the cost of these will depend entirely The beacon for small airports will cost around $300 to $400. The illuminated wind cone will cost in the neighborhood of $150. As for the obstruction lights, the cost of these will depend entirely upon the number and type obstructions with which you have to contend. The cost of obstruction lighting may run from a few dollars to several hundred dollars. It is better to remove the obstructions, if at all feasible.

These, then, are the permanent lighting installations that are currently recommended as minimum standards for new airport lighting. This also means that it takes a certain minimum amount of money to light an airport properly. Poor equipment promotes failures, and failures promote accidents. The three-dimensional element of space is unforgiving of those who make mistakes by giving pilots incorrect light signals.

A Practical Approach to the Best

WITH the help of the American Public Works Association, it is my intention to develop a "Recommended Practice for Public Lighting," which will give not only the ideal standards such as those called for in the Illuminating Engineering Society Code but will be flexible enough to give any city a standard within its reach. Our recommendations could provide a long-range plan for municipal lighting to be accomplished possibly in three stages, the last stage being the lighting provided by the I. E. S. Recommended Practice for Street Lighting, 1945.

In the first stage of the plan, a city could design its lighting system to be financially within its reach, but the lights, cables, and other facilities would be arranged and installed so that in the future, should the city desire to improve its lighting to the second stage, all that would be necessary would be additional lights or larger lamps. The arrangement and facilities would be "laid out" to provide for accomplishing the final stage by steps. Thus, the city, even though it was able to do only a minimum of lighting now, could improve its public lighting later by additions to its existing system without setting up a new system.

W. W. SAUNDERS, *Chief Engineer*
Louisville, Ky.
Chairman, APWA
Committee on Public Lighting, 1947.

BJ Submersible Pump

Why the motor at the bottom of the well?

The only basic improvement in deepwell turbine design . . . since Byron Jackson introduced the deepwell turbine pump in 1901.

SHAFTING LENGTH TROUBLES define the "borderline" beyond which the shaft-type deepwell turbine pump cannot be used successfully. That "borderline" is determined by length of shaft alignment.

THE SUBMERSIBLE IS DIFFERENT. Consisting of close-coupled deepwell turbine pump and electric motor, it operates deep down in the well... *entirely submerged in water* at *any* depth. With no long shaft or shaft-bearings to align, it operates equally well 50 feet down or 1500 feet down. Many are operating at depths from 900 to 1000 feet with amazing efficiency and unvarying dependability. And all because a successful means of sealing an electric motor for underwater operation was developed.

Get this new Submersible Bulletin. Write Dept. 306, Byron Jackson Co., P. O. Box 2017, Terminal Annex, Los Angeles 54, California.

Byron Jackson Co.

LOS ANGELES 54, CALIFORNIA

Offices in Principal Cities

Recent City Manager Appointments

EDWIN H. ALLEN, JR., administrative assistant of Kansas City, Mo., received an appointment to Nevada, Mo.

HARVEY HICKS ALLEN, Director of Public Works, Corpus Christi, Texas, succeeds R. B. Thomas, who goes to Dallas.

ROY S. BRADEN, city manager of Hopewell, Va., 1924-31; Arlington Co., 1932-36; Greenbelt, Md., 1937-43; and High Point, N. C., since 1943, will become first city manager of Raleigh, N. C., on July 15.

CHARLES BRAZIL, former mayor of Colorado City, has been appointed at Taylor, Texas.

ALFRED H. CAMPION, assistant to the Chief Administrator of Los Angeles County, has been appointed first manager of San Diego County, Calif.

WILLIAM H. CARPER, manager of Culpeper, Va., 1940-43; Clifton Forge, 43-45, and Harrisonburg since 1946, has been appointed manager of Burlington, N. C., succeeding Roy L. Williamson.

L. R. BURROW, manager of Raymondville since 1946, has been appointed first city manager of Bonham, Texas.

N. G. DAMOOSE, Director of Public Works, Battle Creek, Mich., has been appointed first city manager of Ypsilanti, Mich.

RANDALL M. DORTON, assistant State Finance Director of California and former manager of Pittsburgh, 1919-25; Monterey, 1925-34; and Long Beach, 1934-39, becomes the first manager of Santa Monica, Calif.

P. F. ELLIS, who has served as city manager of Castle Hill, Me., since 1941, is now taking on the management of Mapleton, Me., as well. He succeeds Wallace B. Waddell, who resigned.

P. A. EDINGTON has succeeded William Holzheid at White Bear Lake, Minn.

PAUL HERMANN, former administrative assistant at Houlton, Me., was appointed first manager of Methel, Vt.

J. W. JEFFREY has replaced J. F. Jones as city manager of Carrizo Springs, Texas.

ERNEST MARINER has succeeded Lionel L. Merrill as town manager of Guilford, Me.

STEVE MATTHEWS, former manager of Borger, 1939-40, and Pampa, Tex., 1940-43, has been reappointed at Pampa.

C. H. O'BRIEN has succeeded K. B. Tanner as city manager of Eastland, Tex.

E. L. O'HARA, city manager of Pittsburg, Calif., since 1942, has been appointed first city manager of Hayward, Calif., effective July 1.

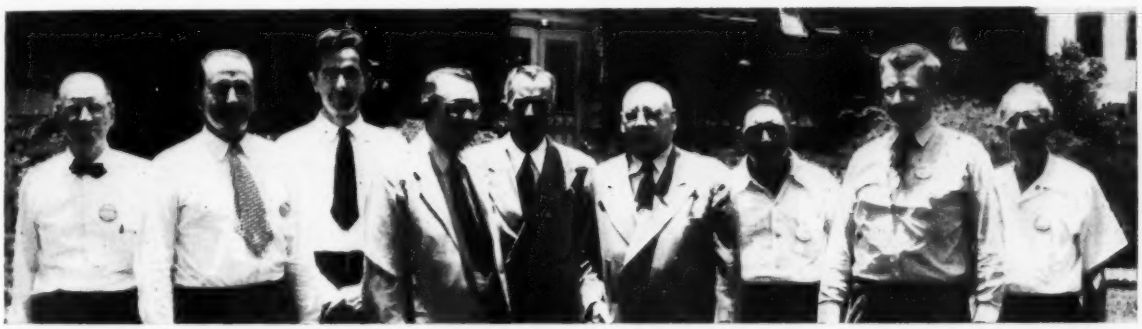
W. H. OSWALT, former administrative assistant at Dallas, Texas, has been appointed at Jacksonville, Texas.

H. F. SMITH has been appointed town manager of Haynesville, Me.

EDDIE M. CYR has succeeded Albert Cyr as town manager of Madowaska, Me.

CLARENCE E. RIDLEY
Executive Director
International City Managers' Association
Chicago, Ill.

City Managers Go To School



SOME of the faculty group of the city managers' short course which was recently held on the campus of the University of Florida by the General Extension Division, under the sponsorship of the Florida State City Managers Association. From left to right, Clarence E. Ridley, Director, International City Managers Association, of Chicago; Carlton F. Sharpe, St. Petersburg, Vice-president of the association; G. Manuel Turner, Assistant Dean of the General Extension Division, in charge; George J. Roark, of Pensacola, President of the state association; C. Lawton McCall, Miami Shores, City Manager, and Secretary-treasurer of the state association; B. C. Riley, Dean of the General Extension Division; J. B. Mobley, Jr., Gainesville City Manager and chairman of the program committee; Manning J. Dauer, Professor of History and Political Science; Walter Bartholomew, Cocoa City Manager.

The Municipal Bond Market

Some sales of new issues reported in June issues of *The Bond Buyer*:

Amount	Borrower and Purpose	Rate (%)	Term (Years)	Basis (%)
$150,000	New Haven, Conn., Temporary Housing for Veterans	1	4.83 Avg.	.976
140,000	Gloucester, Mass., Macadam and Sidewalk Loan of 1947	1	2.75 Avg.	.898
134,000	La Fourche Par., La., Drainage System	1	4 Avg.	1.484
222,000	Corapolis, Pa., Borough	1.25	8.83 Avg.	1.186
75,000	Pittsburg, Kans., Sch. Dist. No. 49.	1.25	4.83 Avg.	1.103
77,000	Nelson, Wis., Road	1.30	4.33 Avg.	1.276
100,000	Yonkers, N. Y., Water	1.40	1-10 Ser.	1.387
600,000	Pala Alto, Calif., Municipal Improvement	1.50	13.25 Avg.	1.457
10,000	Harpersfield Tp., Ohio, Fire Equipment Purchase	1.50	3.17 Avg.	1.367
35,000	Belvidere Tp., Minn., Road and Bridge	1.60	1.83/5.75 O.-A.	1.594
342,000	Edgewater, N. J. Land Acquisition	1.70	1-10 Ser.	1.659
350,000	Hanford, Calif., Sewer	1.75	19.25 Avg.	1.747
15,000	Dewitt, N. Y., Dewitt Fire Dist.	1.75	11.83 Avg.	1.744
28,000	Florissant, Mo., Public Improvement	2	18.25 Avg.	2.133
10,000	Yazoo City, Miss., Airport	2	11-15 Ser.	1.837
116,000	Berlin, Md., Water System Improvement	2	10.25 Avg.	1.9366
11,000	Asheboro, N. C., Water and Sewer Refunding	2.25	22.33 Avg.	2.429
773,000	Delaware Tp., N. J., General Funding	2.70	9.75 Avg.	2.659

For EVERY REFUSE COLLECTION PROBLEM

Leach HAS THE ANSWER

WHAT TYPE OF REFUSE DO YOU COLLECT?

To determine which LEACH Refuse Collection Unit best suits your purpose, it's important to know just what type of refuse your department is called upon to collect.

Certain types of refuse are compactible, while others are not. If you find that a large percentage of the refuse your department has to collect falls into the category of compactible material, The LEACH COMPACTOR is the unit that will fill the bill. With this unit, you can collect far larger loads of compactible material than would otherwise be possible, thus cutting down the number of trips to and from the incinerator or dump.

Perhaps you will find that the bulk of your refuse is of the non-compactible type. In this case, you'll find the LEACH REFUSE-GETTER is the unit best suited to the problem facing your department.

Whether your collection consists of compactible or non-compactible material you'll find the answer to your collection problem in the LEACH Refuse Collection Units!

LEACH COMPANY ESTABLISHED 1887 **OSHKOSH, WISCONSIN**

Conventions—When and Where

Conventions listed this month for the first time are indicated by an asterisk (*)

***July 9-18—Manlius, N. Y.**
INSTITUTE OF COMMUNITY LEADERSHIP (Manlius School). Held in connection with Cooperative Workshop in Community Organization and Development, July 7-Aug. 2. Exec. Dir., Frederick T. Rope, New York State Citizen's Council, 601 E. Genesee St., Syracuse, N. Y.

***July 16-18—Duluth, Minn.**
AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual Meeting. Sec., William N. Carey, 33 W. 39th St., New York, N. Y.

July 21-23—Salt Lake City, Utah
NATIONAL ASSOCIATION OF COUNTY OFFICIALS. Annual Convention (Hotel Newhouse). Sec.-Treas., George F. Simmons, Ogden, Utah.

July 21-25—San Francisco, Calif.
AMERICAN WATER WORKS ASSOCIATION AND THE FEDERATION OF SEWAGE WORKS ASSOCIATIONS. Annual Conference. Sec., A.W.W.A., H. E. Jordan, 500 Fifth Ave., New York, N. Y. Sec., F.S.W.A., W. H. Wisely, 325-26 Illinois Bldg., Champaign, Ill.

July 22-24—Elmira, N. Y.
NEW YORK STATE ASSOCIATION OF CHIEFS OF POLICE. Annual Meeting (Mark Twain Hotel). Exec.-Sec., R. W. Morris, Box 203, Capital Sta., Albany 1, N. Y

***Aug. 14-15—Washington, D. C.**
AMERICAN CONGRESS ON SURVEYING AND MAPPING. Annual Meeting (Statler Hotel). Exec. Sec., Richard T. Evans, P. O. Box 470, Benjamin Franklin Station, Washington 4, D. C.

Aug. 18—New York, N. Y.
EASTERN ASSOCIATION OF FIRE CHIEFS. Annual Convention (Pennsylvania Hotel). Sec., Chas. E. Clark, Box 271, Wayne, Pa.

***Aug. 18-22—Cleveland, Ohio**
NATIONAL SHADE TREE CONFERENCE. Annual Convention (Hotel Cleveland). Sec.-Treas., L. C. Chadwick, Ohio State College, Columbus, Ohio.

Aug. 19-22—New York, N. Y.
INTERNATIONAL ASSOCIATION OF FIRE CHIEFS. Annual Convention (Pennsylvania Hotel). Exec.-Sec., Daniel B. Tierney, 8 Robbins Road, Arlington, Mass.

***Aug. 24-26—Wrightsville Beach, N. C.**
NORTH CAROLINA LEAGUE OF MUNICIPALITIES. Annual Meeting. Exec. Sec., Mrs. Davetta L. Steed, 704 Raleigh Bldg., Raleigh, N. C.

Aug. 27-29—State College, Pa.
PENNSYLVANIA WATER WORKS OPERATORS' ASSOCIATION. Annual Meeting. Sec., I. M. Glace, Harrisburg, Pa.

***Sept. 4-5—Plattsburg, N. Y.**
AMERICAN WATER WORKS ASSOCIATION—NEW YORK SECTION. Fall Meeting (Hotel Champlain). Sec., R. K. Blanchard, 50 W. 50 St., New York, N. Y.

Sept. 8-10—New York, N. Y.
NATIONAL INSTITUTE OF GOVERNMENT PURCHASING. Annual Conference (Hotel Pennsylvania). Exec. Dir., Albert H. Hall, 730 Jackson Place, NW, Washington 6, D. C.

Sept. 11-12—Albany, N. Y.
AMERICAN PUBLIC WELFARE ASSOCIATION. Northeastern Regional Meeting. Dir., Howard L. Russell, 1313 E. 60th St., Chicago, Ill.

***Sept 11-12—Washington, D.C.**
CHAMBER OF COMMERCE OF THE UNITED STATES. Businessmen's Conference on Urban Problems (National Chamber Bldg.). Gen. Mgr., Ralph Bradford, 1615 H St. NW, Washington 6, D. C.

***Sept. 14-17—Roanoke, Va.**
LEAGUE OF VIRGINIA MUNICIPALITIES. Annual Meeting. Sec., Harold I. Baumes, 902 Travelers Bldg., Richmond, Va.

***Sept 15-27—Cambridge, Mass.**
MASSACHUSETTS INSTITUTE OF TECHNOLOGY AND AMERICAN SOCIETY OF PLANNING OFFICIALS. Conference on City and Regional Planning. Dir., Prof. Frederick J. Adams, Massachusetts Institute of Technology, Cambridge 39, Mass.

Sept. 16-19—Boston, Mass.
NEW ENGLAND WATER WORKS ASSOCIATION. Annual Meeting (Statler Hotel). Sec. Joseph C. Knox, 609 Statler Bldg., Boston, Mass.

Sept. 17-19—Atlanta, Ga.
THE GEORGIA WATER AND SEWAGE ASSOCIATION. Annual meeting of Short School for Plant Operators (School of Technology). G. R. Frith, Department of Public Health, Atlanta, Ga.

Sept. 19-20—Superior, Wis.
WISCONSIN CHIEFS OF POLICE ASSOCIATION. Annual Convention (Hotel Androy). Exec. Sec. Walter H. Wagner, Sheboygan, Wis.

Sept. 21-25—Duluth, Minn.
INTERNATIONAL ASSOCIATION OF CHIEFS OF POLICE. Annual Conference (Duluth Hotel). Exec. Sec. Edward J. Kelly, 918 F. St., NW, Washington, D. C.

***Sept 22-25—San Francisco, Calif.**
LEAGUE OF CALIFORNIA CITIES. Annual Meeting. Exec. Sec., Richard Graves, Hotel Senator, Sacramento, Calif.

***Sept. 22-26—New York, N. Y.**
AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS. Annual Meeting (Waldorf-Astoria). Exec. Sec., 1220 National Press Bldg.

Sept. 29-30—Little Rock, Ark.
AMERICAN PUBLIC WELFARE ASSOCIATION. Southwestern Regional Meeting. Dir., Howard L. Russell, 1313 E. 60th St., Chicago, Ill.

Sept. 29-Oct. 1—Los Angeles, Calif.
NATIONAL INSTITUTE OF MUNICIPAL LAW OFFICERS. Annual Meeting. Exec. Dir., Charles S. Rhyne, 730 Jackson Place, N. W., Washington, D. C.

Oct. 1-2—Grand Rapids, Mich.
INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION, INC. Annual Meeting (Pantlind Hotel). Sec., Irvin Shulsinger, 8 E. 41st St., New York 17, N. Y.

Oct. 1-4—Detroit, Mich.
INSTITUTE OF TRAFFIC ENGINEERS. Annual Meeting (Hotel Fort Shelby). Exec. Sec., Robert S. Holmes, 212 Strathcona Hall, Yale University, New Haven, Conn.

Oct. 5-8—Jacksonville, Fla.
AMERICAN PUBLIC WORKS ASSOCIATION. Annual Meeting. Exec. Dir. D. F. Herrick, 1313 ley, 1313 E. 60th St., Chicago, Ill.

Oct. 5-9—Coronado, Calif.
INTERNATIONAL CITY MANAGERS' ASSOCIATION. Annual Meeting. Exec. Sec., Clarence E. Ridley, 1313 E. 60th St., Chicago, Ill.

Oct. 6-8—Niagara Falls, Ont.
THE CANADIAN INSTITUTE ON SEWAGE AND SANITATION. Annual Meeting (General Brock Hotel). Exec. Sec., Dr. A. E. Berry, Parliament Bldg., Toronto, Ont.

Oct. 6-10—Chicago, Ill.
NATIONAL SAFETY COUNCIL. Annual Meeting (Stevens Hotel). R. L. Forney, 20 North Wacker Drive, Chicago 6, Ill.

Oct. 6-11—Atlantic Ciity, N. J.
AMERICAN PUBLIC HEALTH ASSOCIATION. Annual Meeting. (Convention Hall). Exec. Sec., Reginald M. Atwater, 1790 Broadway, New York, N. Y.

Oct. 8-10—Atlantic Ctiy, N. J.
PENNSYLVANIA WATER WORKS ASSOCIATION. Mrs. Ethel M. Markley, 510 Telegraph Building, Harrisburg, Pa.

***Oct. 8-11—New York, N.Y.**
GOVERNMENTAL RESEARCH ASSOCIATION. Annual Conference (Hotel Commodore). Sec., G. Gordon Tegnell, 30 Rockefeller Plaza, New York 20, N. Y.

Oct. 12-15—Colorado Springs, Colo.
NATIONAL ASSOCIATION OF COMMERCIAL ORGANIZATION SECRETARIES. Annual Meeting (Antlers Hotel). Exec. Sec., Elizabeth Glenn, 1615 H Street, N. W., Washington 6, D. C.

***Oct. 13-15—Amarillo, Texas**
AMERICAN WATER WORKS ASSOCIATION—SOUTHWEST SECTION. Annual Meeting. Sec., L. A. Jackson, Little Rock Water Works, Little Rock, Ark.

Oct. 13-17—New York, N. Y.
NATIONAL RECREATION ASSOCIATION. Annual Meeting (Hotel New Yorker). Sec., Howard Braucher, 315 Fourth Ave., New York 10, N. Y.

Oct. 16-17—Ocean City, Va.
VIRGINIA INDUSTRIAL WASTES AND SEWAGE WORKS ASSOCIATION. Annual Meeting (Nansemond Hotel). Sec., A. H. Passler, 815 East Franklin St., Richmond 19, Va.

Oct. 27-28—Jefferson City, Mo.
MISSOURI WATER AND SEWERAGE CONFERENCE. Annual Meeting (Governor Hotel). Sec-treas., Warren A. Kramer, State Office Bldg., Jefferson City, Mo.

***Nov. 2-6—New Orleans, La.**
AMERICAN MUNICIPAL ASSOCIATION. Annual Meeting. Exec. Dir., Earl D. Mallery, 1313 E. 60th St., Chicago, Ill.

***Nov. 3-5—Atlanta, Ga.**
AMERICA WATER WORKS ASSOCIATION—SOUTHEASTERN SECTION. Annual Meeting. Sec., B. P. Rice, Reconstruction Finance Corp., Bond Service Division, Healey Bldg., Atlanta, Ga .

***Nov. 12-14—Atlantic City, N.J.**
NEW JERSEY STATE LEAGUE OF MUNICIPALITIES. Annual Conference. Exec. Sec., James J. Smith, 808 Trenton Trust Bldg., Trenton, N. J.

Nov. 12-14—Pittsburgh, Pa.
ENGINEERS SOCIETY OF WESTERN PENNSYLVANIA. Annual Meeting (William Penn Hotel). Chairman, H. M. Olson, 171 Longue Vue Drive, Pittsburgh, Pa.

Nov. 17-20—New York, N. Y.
NATIONAL ASSOCIATION OF HOUSING OFFICIALS. Annual Meeting (Hotel New Yorker). Exec. Dir., Coleman Woodbury, 1313 E. 60th St. Chicago, Ill.

Nov. 17-20—Dallas, Texas
CIVIL SERVICE ASSEMBLY OF THE UNITED STATES AND CANADA. Annual Meeting (Baker Hotel). Dir., James M. Mitchell, 1313 E. 60th St., Chicago 37, Ill.

Nov. 19-21—Washington, D. C.
AMERICAN WATER WORKS ASSOCIATION—Four States Section. Annual Meeting. Sec. Treas., W. A. Welch, 748 Public Ledger Bldg., Philadelphia, Pa.

Nov. 20—Boston, Mass.
NEW ENGLAND WATER WORKS ASSOCIATION. Annual Meeting (Statler Hotel). Sec. Joseph C. Knox, 609 Statler Bldg., Boston, Mass.

***Dec. 1-6—Washington, D. C.**
HIGHWAY RESEARCH BOARD. Annual Meeting (National Academy of Sciences). Dir., Roy W. Crum, 2101 Constitution Ave. NW, Washington 25, D. C.

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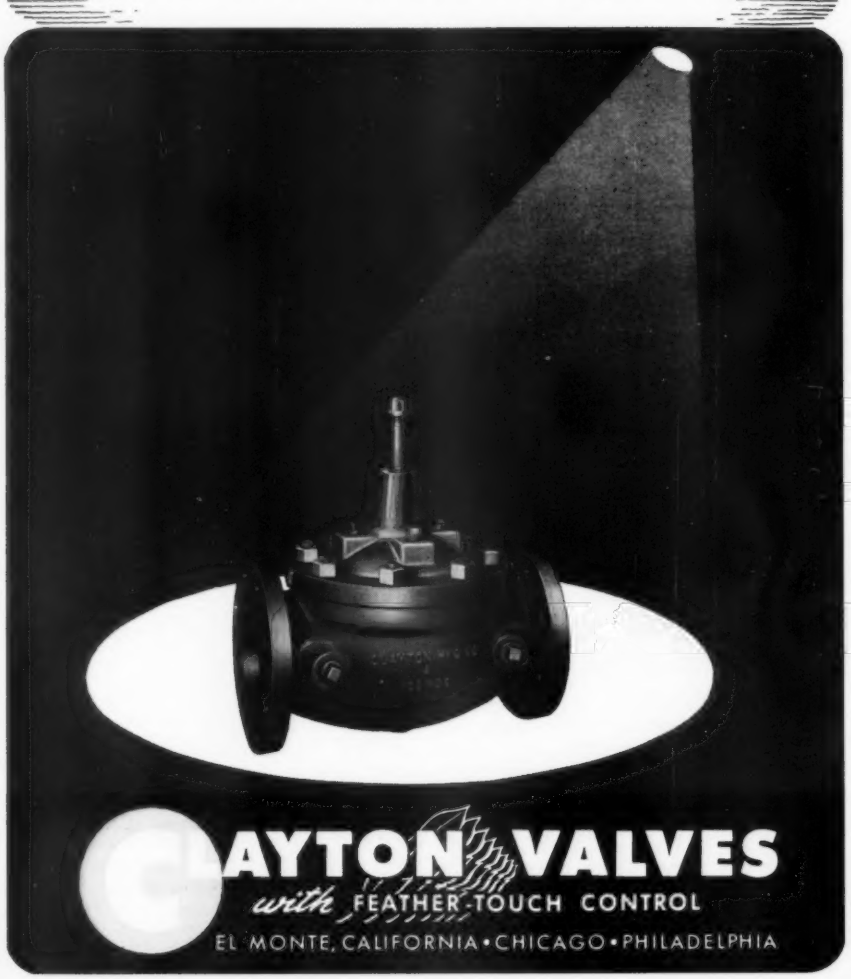

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Municipal and Civic Publications

Fire Department Public Relations

A Public Relations Manual for Fire Departments—*National Fire Protection Association, 60 Batterymarch St., Boston, Mass.*. 1947. 32 *pp.* $1.00.

That good public relations is essential to the work of fire departments is the theme of this readable booklet. Believing that many fire departments fail to realize fully the advantages of local press and radio facilities, the Committee on Public Relations of the National Fire Protection Association has produced an extremely attractive and complete "know-how" manual to show fire departments just how to plan fire control campaigns and specifically prepare press releases, speeches, and radio material.

A good public relations program, the booklet states, can gain the cooperation of municipal, newspaper, and radio officials and other molders of public opinion; make the department favorably known to the community; create a better understanding of the department's problems, needs, and functions; help to maintain the department as the strong protective force it is meant to be.

Tax Limitation Appraisal

The 15-Mill Amendment—*By Carl J. Faist, Director of Finance, City of Saginaw, Mich.* 1947. 30 *pp.* 50 *cents per copy.*

Published by Mr. Faist as a private citizen, this booklet represents a scholarly, informative discussion of one city's financial plight which has resulted to a large degree from a constitutional limitation of its real-estate-taxing powers.

The author's purpose in writing the booklet was first, to acquaint new voters with the so-called 15-mill amendment, explain what it is and how it operates; second, to summarize results of the first twelve years of its operation in one typical Michigan city; third, to stimulate thinking about its future effects upon Saginaw.

The study shows conclusively that the tax limitation is strangling the city's growth, and that Saginaw no longer can keep abreast of essential municipal services and improvements on the limited local resources available to it. Sources of possible new taxes cited are a sewer rental charge, income tax, and taxes on amusements, cigarettes, and alcoholic beverages.

School Report

School Subsidies—*Report Five of The School Commissions to The General Assembly of the Commonwealth of Pennsylvania.* 1947. *Harrisburg, Pa.* 47 *pp.*

This report deals with the major problems which have arisen since the installation of Pennsylvania's new school subsidy system provided for in 1945.

The report briefly outlines the problems consequent upon the installation of the new, reimbursement system, indicates the attitudes of citizens' groups toward the new situations which have arisen under Act 403, and presents the pertinent facts and the Commission's recommendations.

Piecemeal Zoning

Piecemeal Zoning—Its Place in Zoning Law and Procedure—*By John W. Reps. Springfield Chamber of Commerce, Springfield, Mo.* 1947. *Mimeo.* 14 *pp.* 15 *cents.*

An illuminating discussion of piecemeal zoning which points out that when properly applied and constantly re-examined, piecemeal zoning ordinances may prove of great value to many cities and counties, although they should be undertaken only after considerable study and as a last alternative.

Recreation Planning and Design

Recreation Areas, Their Design and Equipment—*Prepared for National Recreation Association by George D. Butler. A. S. Barnes and Co., of West 44th St., New York* 18, *N. Y.* 1947 174 *pp.* $6.00.

This volume should be an indispensable guide to those responsible for the planning of recreation areas, especially playgrounds, playfields, and athletic fields. It outlines planning principles, offers practical suggestions for the design of areas, and contains detailed information as to facilities, structures, and equipment. Although it is not meant to be a construction manual, much of the information in the volume should be useful in the preparation of construction plans.

The book contains a fund of information and material based on long experience on the part of recreation workers and planners in the design and operation of recreation areas.

The 169 photographs, sketches, and diagrams are useful in passing on the many practical suggestions in the text itself. Throughout the book, the emphasis is on forethought and ingenuity as a means of obtaining maximum value for the recreation dollar. A comprehensive bibliography contains many references which should add further to the volume's importance to recreation planners.

1947 Municipal Law

Municipalities and The Law in Action, 1947 Edition—*Charles S. Rhyne, Editor. The National Institute of Municipal Law Officers, 730 Jackson Place, N. W., Washington* 6, *D. C.* 660 *pp.* $10.00.

This report of city legal experience during the first full year of the post-war period consists of the proceedings of the 1946 annual conference of the National Institute of Law Officers.

This is the tenth in the series of volumes designed to aid busy city attorneys in determining what other cities are doing and why and how they were doing it. This particular edition contains not only references to practically every phase of municipal legal activity during the year, but also searching analyses of particular problems. The annual reports of the Institute's eighteen committees, which recapitulate all of the significant legal occurrences of the preceding year in their particular field of activity are reproduced in full, and should be found extremely valuable. These reports, written by practicing city attorneys, cover a wide range of topics of interest to municipalities.

City Labor-Management Plans

City Plans For Promoting Industrial Peace—*American Municipal Association, 1313 E. 60th St., Chicago* 37, *Ill.* 1947, 32 *pp.* $1.50.

This report describes in detail the organization, financing, procedures, jurisdiction, and work of the Toledo and Louisville labor-management-citizens' committees and the New York City Division of Labor Relations. It describes briefly the labor-management committee recently established in Boston, whose jurisdiction is restricted to city employe grievances. An analysis is made of the discontinuance of municipally sponsored labor-management committees in St. Louis and Racine, Wis.

The report emphasizes that although labor-management committees offer "perhaps the most potentially effective plan yet devised" for promoting industrial harmony at the local level, they must have the full support of both factions to be successful.

Street Improvement Standards

Neighborhood Standards, Section On Street Improvements—*Federal Housing Administration, Land Planning Bulletin No.* 3. 1947. 95 *pp. Copies available to city engineers, planning commissions, and other interested officials upon request to the Underwriting Division, FHA, Washington, D. C.*

The bulletin is issued by FHA in recognition of the fact that suitable improvement of streets is an essential element in the creation and maintenance of stable and attractive residential areas. When the data sheets are adjusted to meet local existing conditions, they can be used in general by development sponsors as guides toward the solution of technical problems.

Small Community Progress

The Small Community Looks Ahead—*By Wayland J. Hayes. Harcourt, Brace and Company, 383 Madison Ave., New York* 17, *N. Y.* 1947. 276 *pp.* $3.00.

The strategic importance of small communities in determining the pattern of the nation's future is outlined in this comprehensive view of small community life. An analysis of the techniques and processes necessary for a community's full development also is given. The author writes with a background of sociological insight and understanding, and by the use of numerous community case-histories, such as that of Fews Chapel, Tenn., provides a wealth of suggestions for practical methods and devices by which a community can achieve a richer, more complete existence.

One of the chief purposes of the book is to help civic-minded citizens in advancing their own programs within the framework of an adequate and balanced social structure, and to provide perspective on the nature of community growth and planning.

A bibliography, a score card for self-evaluation of communities, and sixteen pages of photographs of small community activities add greatly to the value of the book.

Rural Local Government

Local Government and Rainfall: The Problems of Local Government in the Northern Great Plains.—*By Herman Walker, Jr., and Peter L. Hansen. Article appearing in* The American Political Science Review, *December* 1946. 10 *pp.*

A description and discussion of local government problems and procedures in the sparsely populated, arid area of southwestern North Dakota. A fickle rain is ruler of the country, which makes desirable a foresighted scheme of flexible public finance, and a number of other local government organizational changes.

Cooperative Planning

The Sunset Community Center, An Achievement In Cooperative Planning—*San Francisco City Planning Commission, San Francisco, Calif.* 1947. *Mimeo.* 8 *pp.*

This report describes simply and briefly how the San Francisco Planning Commission, through working closely with various city departments and agencies and maintaining a good public relations program, was able to mobilize support for an important community center project which represents a concrete achievement in coordinated planning.

The initiation and preliminary planning of the project came from the Planning Commission, but among those participating in the project now are the Board of Education, the Recreation Commission, the Public Library Commission, the Department of Public Health, and the Department of Real Estate.

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Municipal Utilities

FINANCIAL ADMINISTRATION OF MUNICIPAL UTILITIES—*By Irving Tenner. Public Administration Service, 1313 East 60th St., Chicago 37, Ill.* 1947. 152 *pp.* $3.75.

The book discusses the principles underlying the financial administration of municipal utilities and the procedures to be followed in the application of these principles. Although the monograph deals only with electric and water plants, most of the principles discussed apply also to other utilities such as airports, gas plants, sewer plants, street cars and buses, steam-generating plants, etc.

Among the aspects of financial administration discussed in the book are organization, policies, rate structures, budgeting, debt administration, handling customer accounts, proper custody and control over cash, the proper purchasing, storaging, and issuing of materials and supplies, accounting for salaries and wages, proper management of fixed assets, general and cost accounting principles and procedures, and good financial reporting.

The book should help to promote the use of up-to-date and efficient methods and techniques in this important field.

Ordinances for Transient Traders

MUNICIPAL REGULATION OF PEDDLERS, SOLICITORS, AND ITINERANT MERCHANTS—*By Charles S. Rhyne, Charles H. Burton, and Charlie O. Murphy. Report No. 118. National Institute of Municipal Law Officers, 730 Jackson Place, N. W., Washington 6, D. C.* 1947. 165 *pp.* $5.00.

The study contains three annotated model ordinances, one each for peddlers, solicitors, and itinerant merchants. One section of the report is devoted to a table setting forth a comparative study of the provisions contained in the ordinances of eight cities. The study also suggests a new method of taxing solicitors who take orders for delivery of goods in interstate commerce to avoid the effect of recent decisions of the U. S. Supreme Court in this field.

The monograph is particularly timely, since transient traders are again becoming so numerous as to constitute a major problem for cities.

Negro Veterans

OUR NEGRO VETERANS—*by Charles G. Bolté and Louis Harris. The Public Affairs Committee, Inc., 22 E. 38th St., New York 16, N. Y.* 1947. 31 *pp.* 20 *cents.*

The fact that the GI Bill gives advantages to the Negro as well as to the white veteran has not been fully realized throughout the country. "Our Negro Veterans" reveals the statistics of the problem which show that in reality the Negro is deprived of equal citizenship. He has lost out in employment, in housing, in education, and in governmental help. This pamphlet gives the facts of the situation and suggestions for remedying it.

Oil and Gas Control

NATURAL GAS AND THE PUBLIC INTEREST—*By Frederick F. Blachly and Miriam E. Oatman. The Granite Press, 1025 Connecticut Ave., Washington 6, D. C.* 159 *pp.* $1.00.

A very readable, thorough study has been made by the authors about the problems concerning governmental control of oil and gas. This work includes information on the private integration of the natural gas industry, state regulation and control, and federal control.

Recreational Films

SPORTS, PHYSICAL EDUCATION AND RECREATION FILM GUIDE—*Business Screen Magazine in cooperation with The Athletic Institute. Film Guide Dept., The Athletic Institute, 209 S. State St., Chicago 4, Ill.* 1947. 76 *pp.* 50 *cents.*

A comprehensive listing of more than 800 16 mm. sound and silent motion pictures and 35 mm. filmstrips for instructional and recreational use by coaches, athletic, and recreation directors, and for program chairmen of civic and recreation groups.

Measuring Urban Densities

X-RAY THE CITY—*Ernest Fooks. The Ruskin Press, 123 Latrobe St., Melbourne, Australia.* 1947. 107 *pp.* 12 *Shillings.*

This book tries to clarify and define many of the widely used town-planning terms and deals in particular with the problem of population distribution in urban areas. It suggests a method of measuring population densities in such areas by means of a density diagram and distance-density factors, with a view toward having this method adopted internationally as a basis for urban planning.

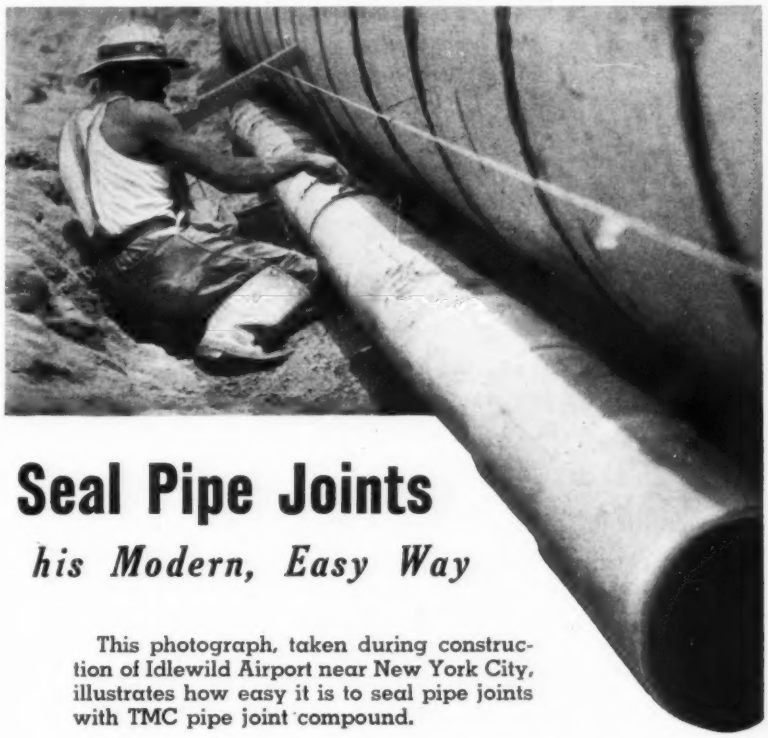
Maps of Melbourne are used to illustrate Dr. Fooks' suggestion of recalculating population from the customary persons-per-acre basis to one using geometrically defined areas by means of his density diagram. As the spotting and distribution of community facilities depend upon population and distance, Dr. Fooks believes that his method could serve as a tool for urban planning and analysis throughout the world, even though there would, of course, remain many variables which could not be accurately measured.

Parking Meter Ordinance

PARKING METERS—LEGALITY—MODEL ORDINANCE ANNOTATED—*By Charles S. Rhyne and Charlie O. Murphy. Report No. 119. National Institute of Municipal Law Officers, 730 Jackson Place, N. W., Washington 6, D. C.* 29 *pp.* $2.00.

The text of this report is divided into two main parts, the first describing and explaining the purpose of parking meters, and the second discussing the legal decisions relating to their use.

The latter part of the report is devoted to a Model Parking Meter Ordinance and annotations explaining and giving the reasons for the inclusion of each paragraph.



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State-Local Relations

STATE-LOCAL RELATIONS—*Committee on State-Local Relations of the Council of State Governments. The Council of State Governments, Chicago 37, Ill.* 1946. 228 *pp.* $3.50.

This is the most important recent study of administrative, fiscal, and legal relations of local to state governments which has appeared in recent years. The committee of eleven included four state governors and six other state officers. The entire report stresses two central ideas:

First, "local units of government should be strengthened so that they may meet their day-to-day problems promptly and efficiently. Local freedom, though limited, is important for administrative effectiveness and as a means of attaining meaningful local democracy."

Second, "state supervision of local affairs should be improved so that activities of statewide concern will be carried out in all jurisdictions at a high level of performance."

The committee suggests four policies for the states in dealing with their local governmental units: (a) a grant of great powers to local units; (b) a more flexible state-administrative supervision; (c) assistance to localities in securing stable and adequate revenues; (d) promotion of the enlargement and consolidation of local governments. Throughout the report, there is a strong and encouraging emphasis on the inevitable relation between democracy and efficiency—which is the core of the future stability of our American society.

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Canadian Municipal Survey

PROVINCIAL-MUNICIPAL RELATIONS IN BRITISH COLUMBIA.—*Report of the Commissioner, H. Carl Goldenberg, Victoria, B. C.* 1947. 190 *pp.*

This is a report of a Commissioner appointed by the Lieutenant-Governor, Province of British Columbia, to investigate municipal functions. The report makes specific recommendations for stabilizing the finances of the Canadian municipalties and providing a wider margin for municipal operations.

The report recommends increased provincial aid for the general services of education and social welfare; an extension of provincial expenditures for streets and roads; other readjustments in provincial-municipal relations affecting hospitalization, public health, the administration of justice, and Crown property; changes in municipal assessment and taxation policies and practices, and the levying of a municipal business tax.

Smoke Control Ordinance

CITY SMOKE CONTROL AND AIR POLLUTION PROGRAMS—MODEL ORDINANCE ANNOTATED—*By Charles S. Rhyne and William G. Van Meter. Report No. 120. National Institute of Municipal Law Officers, 730 Jackson Place, N. W., Washington 6, D. C.* 1947. 23 *pp.* $2.00.

The chief approaches to the control of dense smoke emission which are adopted by the report are the requirements that smokeless solid fuels be used, that new fuel consuming devices and repairs to existing furnaces be approved, and that annual inspections be made by a superintendent of smoke control. The model ordinance pictorially establishes the standards by which the density of smoke shall be gauged by incorporating the Ringlemann Chart into one of its sections.

Milwaukee Ordinances

CHARTER ORDINANCES OF THE CITY OF MILWAUKEE.—*Municipal Reference Library, Room 803. City Hall, Milwaukee 2, Wis.* 1946. 88 *pp.* $1.50.

This booklet contains all charter ordinances passed by the Common Council of Milwaukee from the time of the home-rule amendment in 1925 to December 25, 1946. It is in a form which many municipalities might emulate in classifying and making their ordinances more useful.

Food Sanitation Practice

MILK AND FOOD SANITATION PRACTICE—*By H. S. Adams. Commonwealth Fund, 41 E. 57th St., New York 22, N. Y.* 1947. 311 *pp.* $3.25.

The book is a practical text in the field of environmental sanitation designed to help public health engineers and sanitarians bridge the gap between theory and practice — between what should be done and how to do it. Essential principles of the sanitary supervision of milk and food supplies are presented from the standpoint of actual field application.

There is emphasis in the book on the educational approach as a productive means of advancing sanitation. The author declares that classes of instruction for dairymen, milk-plant operators, restaurant proprietors, and food handlers offer an excellent opportunity for imparting valuable information, and that such an educational approach should always occupy a foremost place in program planning.

A Village Plan for Improvement

THE VILLAGE PLAN, GLENDALE, OHIO—Prepared *for Village Planning Commission by Harland Bartholomew and Associates.* 1947. 76 *pp.*

Attractively published, this plan for a municipality of about 2,500 population recognizes that the continuance of a satisfactory community depends upon looking ahead and planning for the future.

The foreword by the mayor declares that the plan was not made to encourage the spending of money, but rather to make sure that the money that is spent, both publicly and privately, goes into the right type of development and improvement.

Although the consultants helped with technical advice and recommendations, each part of the plan was carefully studied and analyzed by the Village Planning Commission and the Village Council before it was approved and officially adopted.

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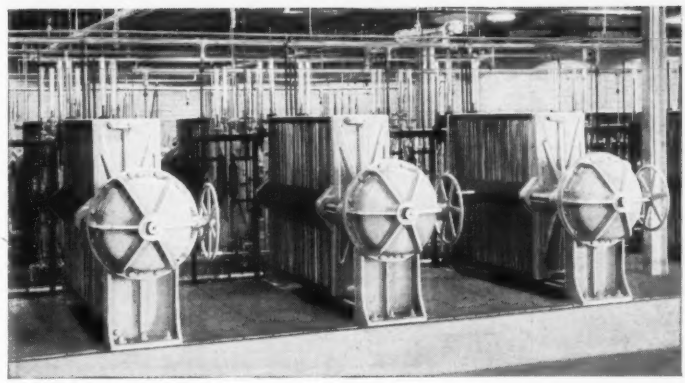

We suggest that city engineers now confronted by problems of pollution recommend that local industries investigate this process. They may be throwing away material that can be turned to profit through recovery or reuse as a salable by-product or they may wish to remove foreign material and purify their product.

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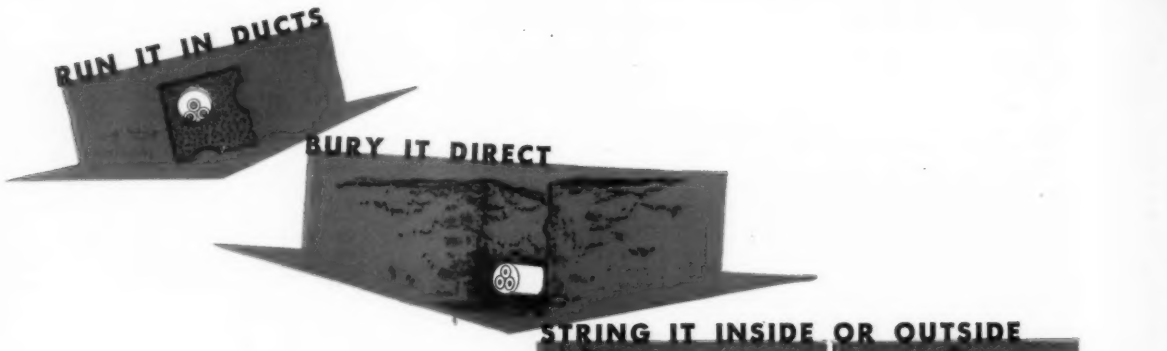
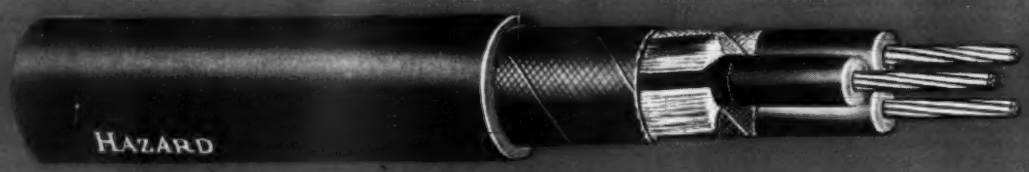


HAZARD'S VERSATILE HAZASHEATH



a non-metallic armored cable that simplifies power and distribution installations up to 5,000 volts . . . that's built, from the tinned copper conductors to the tough outer sheath, to assure long, low-cost, trouble-free cable life

Special cable to meet special service requirements — that's usually a pretty safe rule to follow. But every good rule has an exception sometimes and, such an exception is Hazasheath.

Tinned copper conductors are first protected with a strong, resilient wall of moisture-resistant Submarine insulation. Over this conductor insulation goes tightly wound protective tapes. And then to give this cable its installation versatility, the outer sheath is a thick jacket of Hazaprene, compounded with neoprene, and mold cured under heavy pressure. This Hazasheath jacket resists oil, sunlight, acids, moisture, chemicals and mechanical damage. It has all the necessary protection for aerial, underground or conduit service built in . . . makes cable installation simple, fast and economical. For complete details, see your Hazard representative or write for Hazasheath Bulletin 322. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

5165

HAZARD

insulated wires and cables for every electrical use

A Traffic Relief Program

REPORT OF THE LEGISLATIVE COMMISSION ON RAPID TRANSIT, 1947—*The Commonwealth of Massachusetts, Metropolitan Rapid Transit Commission, Room* 167, *State House, Boston, Mass.* 1947. 62 *pp.*

The traffic problem of large cities is not insurmountable, the report declares, and it recommends the establishment of a first-class metropolitan transit system in the Boston area, to be operated by a rapid-transit authority. The report proposes to extend rapid-transit lines out to the suburban areas of population, achieving speed, comfort, and economy by the use of modern electric trains operating over available tracks of the railroads.

Connections between present rapid-transit facilities and the railroad lines can be achieved relatively easily, the report states, pointing out that using existing subways and railroad rights of way virtually eliminates damages for the taking of land. Declaring that railroad commuter service is uneconomical, the report urges an integrated transit system under public ownership and operation, which cannot be undertaken by the railroads as presently organized.

Maintaining that such a proposed system could be built and established for less than the cost of a single superhighway, which increases the concentration of vehicles at the center of the city, the report states that frequent and fast rapid-transit service would attract many motorists who now use their private automobiles to get to work because of the inadequacy of present facilities.

The Police and Traffic

TRAFFIC ENGINEERING AND THE POLICE—*By Henry K. Evans and Franklin M. Kreml. Revised Edition. Published jointly by National Conservation Bureau,* 60 *John St., New York* 7, *N. Y., and Traffic Division, International Association of Chiefs of Police,* 1704 *Judson Ave., Evanston, Ill.* 1947. 104 *pp.* $2.00.

This revised and expanded edition describes certain traffic engineering activties that may be undertaken by the police, and it relates and interprets the broad field of traffic engineering to the police. One purpose is to encourage more effective work in communities where the police are alone in handling traffic engineering activities. The other purpose is to bring about a better understanding between the police and the traffic engineer where a traffic engineering division is functioning in the city organizational setup.

The book performs a useful service in defining the fields involved in handling traffic, and in offering many practical suggestions for its proper control.

Parking and Accidents

INFLUENCE OF PARKING ON ACCIDENTS—*By Wilbur S. Smith. The Eno Foundation for Highway Traffic Control. Saugatuck, Conn. Re print from the April,* 1947, *issue of* THE TRAFFIC QUARTERLY. 18 *pp. Free.*

A study which shows that prohibiting curb parking and rigidly controlling loading and unloading operations are aids in reducing accidents in areas where traffic densities are heavy.

Planning and Housing Reports

MIAMI, FLA. — Miami Planning and Zoning. 1946. The City Planning Board of Miami. Maps. Illus. Charts. 33 pp.

NEW YORK, N. Y.—New York City's Population Growth, 1790-1970. Consolidated Edison Company of New York, Inc., Economic Research Dept. 1946. Charts. Mimeo. 28 pp.

OGLESBY, ILL.—Sixteenth Annual Report. Prepared by Edward Hand, City Clerk. Illus. 51 pp.

SCOTTSBLUFF, NEBR.—City Plan for Scottsbluff. Summary and Conclusions. S. R. DeBoer & Co., City Planning Consultants, 515 Iliff Ave., Denver, Colo. Maps. Mimeo. 96 pp.

SEATTLE, WASH. — The Economic Foundations and Trends in City and County Planning. 1946. Bureau of Public Administration, University of Washington. Mimeo. 13 pp.

Other Reports Received

ALBANY, N. Y.—Digest of 1947 Laws Affecting Towns. Association of Towns of the State of New York. Edward F. N. Uthe, Executive Secretary. 36 pp.

CALIFORNIA — Report to Legislature on Water Problems of the State of California by Joint Legislative Committee on Water Problems. 1947. Senator Bradford S. Crittenden, Chairman. Charts. Illus. 102 pp.

EAST ORANGE, N. J.—East Orange Water Department. 1924-1946. A record of its accomplishments. Illus. 24 pp.

ELMIRA, N. Y.—Elmira Water Board, 32nd Annual Report. 1946. M. Doyle Marks, President. Illus. 40 pp.

ERIE, PA.—Budget for 1947. Where the Tax Dollar Goes. Sherman Hickey, Jr., Department of Accounts and Finance. 57 pp.
—Annual Report of Department of Accounts and Finance. 1947. Sherman Hickey, Jr., Director. 75 pp.

LEXINGTON, KY.—Budget. 1947. Audit Report 1946. William White, City Manager. 79 pp.

LOS ANGELES, CALIF.—Organization, Administration and Management of Administrative Services. 1947. Bureau of Budget and Efficiency, 120 City Hall. Francis M. Cummings, Director. Mimeo. 25 pp.

NEWARK, N. J.—Health Report for the City of Newark. Department of Health. Charles V. Craster, M.D., D.P.H., Health Officer. 1946. Graphs. Mimeo. 26 pp.

NEW HAVEN, CONN.—Department of Health, Annual Report. 1946. Charts. 32 pp.

OAK PARK, ILL.—Annual Report. Department of Public Works. 1946. M. S. Dutton, Commissioner of Public Works. Charts. Mimeo. 70 pp.

PHILADELPHIA, PA. — Fairmount Park Association. 75th Annual Report. 1947. Sidney E. Martin, President, 1421 Chestnut St. Illus. 71 pp.

TOLEDO, OHIO—Annual Report. Division of Streets. 1946. Harry M. Loucke, Commissioner, 320 Safety Bldg. Mimeo. Charts. 116 pp.

WAVERLY, IOWA—Annual Report. Municipal Power and Water. 1946-1947. Glen V. Yarger, Supt. of Municipal Utilities, City Engineer. Charts. Illus. 15 pp.

The finish on Park-O-Meters has to be *tough*. It has to stand up whether the thermometer hits top or bottom. That's why the Macnick Company, Tulsa, Okla., chose Jensen "dual heat" infra-red for their paint baking.

C. R. Horton, chief engineer of Macnick, reports: "Jensen dual heat is exceedingly successful."

AMAZING INCREASE IN PRODUCTION, TOO!

When Macnick called in Jensen to design, engineer and build an oven to paint bake the aluminum castings that make up the Park-O-Meter, their production requirements called for finishing 600 castings per 5-hr. day. But now one Jensen infra-red oven—15 feet long, incorporating 180 lamps and using only 45 KW's—finishes 1500 pieces in that time!

Photos courtesy "Electrified Industry."

You, too, can benefit by the startling efficiency of Jensen "dual heat." Write Jensen about your problem *today!*

JENSEN SPECIALTIES, Inc. **JENSEN** 9331 FREELAND DETROIT 27, MICH.

DESIGNERS and BUILDERS of "DUAL HEAT" INFRA-RED OVENS • CONVEYORS • PAINT DIP TANKS

News and Illustrations

Items of interest to city, town and county officials and others concerned with the economical construction and efficient operation of public improvement undertakings

How to Correct Trade Wastes Painlessly

Trade wastes can either be neutralized after they are in the sewage and thereby add to the cost of treatment, or they can be removed before they leave the plant and not only reduce treatment casts, but also save the contributing industry money. One system that has rolled up an impressive record for itself in industry and that municipal officials should know about is the Webcell Continuous Dialyser manufactured by the Brosites Machine Co., Inc., 54 Church St., New York 7, N. Y.

For a typical example, the rayon industry originally threw away much of its caustic soda after it had become contaminated with large amounts of hemi-cellulose which was detrimental to the rayon. This caustic soda, of course, made the sewage difficult to treat and required neutralizing which increased the solids loads.

Today a large dialyser installation in a rayon plant will pay for itself on the recovery of caustic soda in slightly over a year. Thus it not only makes an important contribution to the plant's economy, but it also reduces the caustic soda content in the final waste to roughly 1%.

Where trade wastes are received of widely varying acid and alkaline character, municipal sewerage officials are advised to contact the Brosites Machine Company and learn about this dialysing process that will help them prevent the problem rather than have to correct it. This company's engineers will gladly cooperate with sewerage officials confronted with these difficult problems and will send literature describing the dialyser process.

Philadelphia Ozone Plans Go Forward

Work on Philadelphia, Pennsylvania's ozone plant, America's largest for water treatment, is going forward with much of the work under contract, according to Elbert J. Taylor, Chief of the Bureau of Water. When completed, at an estimated cost of $1,000,000, the plant will treat 36 mgd, or more than ten times the capacity of the next largest plant.

Ozone will be manufactured by passing "dry" air across a 15,000-volt spark. The ozone will then be diffused through the water in 20-foot deep concrete tanks which will be housed in one of the new buildings. The air will be cleaned in electrostatic filters efficient enough to remove even traces of cigarette smoke. After the ozone has been generated, it will be pumped in the bottom of basins through a porous grid so that it can oxidize the taste-and-odor forming organic material in the water.

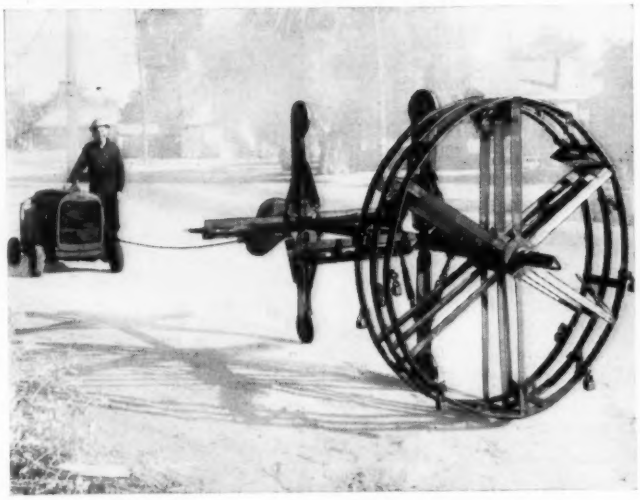
Present plans are to combine ozone with the use of activated carbon to insure thorough taste and odor control measures.

Check Corrosion of Steel

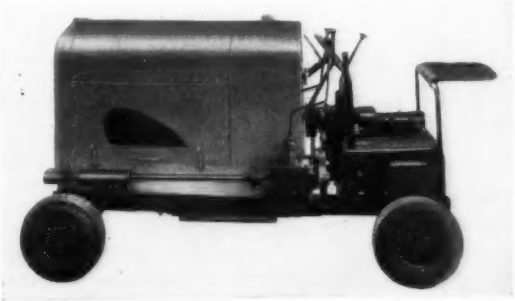
A new method of combatting corrosion in all types of steel structures and projects will soon be used by Tate Pipe Linings, Inc., Andover, Mass., according to a recent announcement by Bruce Harkness, Chief Engineer of the company.

The method, developed in Australia, has been found so effective that all public-works projects in Australia involving use of corrosive metals are to be treated with this method in the future.

RELINING LARGE PIPE?



No cement-lined jobs have ever given any trouble where the pipe was properly cleaned. "Flexibles" take off all the scale down to the metal itself. It may, indeed, cost a few cents more, but it's tops in insurance on large projects. For further information or catalogs, write Dept. 9 today.



1947 Model "Flexible" Power Drive.

FLEXIBLE UNDERGROUND PIPE CLEANING CO.

9059 Venice Blvd., Los Angeles, California

855 Board of Trade Bldg. Chicago 4, Ill.
401 Broadway New York 13
147 Hillside Ter. Irvington, N. J.
Lancaster, Texas 41 Greenway St.
P. O. Box 447 Atlanta
1624 Harmon Place Minneapolis 3, Minn.
29 Cerdan Ave. Roslindale 31, Mass.
P. O. Box 694 Pittsburgh
Hamden, Conn. P. O. Box 165

San Francisco Destination For Demonstration Trailer

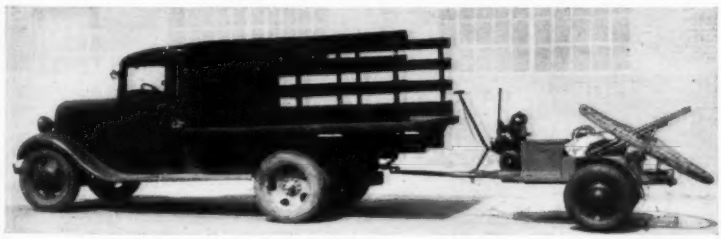
%Proportioneers, Inc.%, 99 Codding St., Providence, R. I., is launching its new demonstration trailer by way of a trip to San Francisco—destination, the combined conventions of the American Water Works Association and the Federation of Sewage Works Association to be held July 21 through July 25.

The trailer left Providence early in June, stopping at various points en route for exhibition purposes. Included in the trailer demonstrations are typical installations of equipment for chlorinating or treating constant rate of flow (pumped) systems; variable rate of flow (gravity) supplies; a new chlorine-dioxide treatment of water for the elimination of tastes and odors in potable water supplies; a "chemistry-free" diatomaceous earth filter; various units for emergency main sterilization; low-cost emergency stand-by chlorination, and special proportioning pumps for feeding DDT emulsion for filter fly control.

%Proportioneers, Inc.%'s San Francisco-bound trailer.

WANT THIS?

PRESENT FLEXIBLE USERS, PLEASE NOTE: For some years past, we have had many inquiries for a practical, "Flexible" trailer or "Carryall." Designed for use in carrying rods, pipe guide, power drive, operating tools, hose, picks, shovels, bucket, rope and red flags. Everything needed in one mobile unit. Take it to the job and leave it. Relieve stand-by truck for other service.



We're depending on you "old timers" to write us. Let us know if you want this trailer manufactured. We have many other items we can make, and must use our factory facilities to serve you best. Yes or no, we want to hear from you. Write Dept. 10 today.

FLEXIBLE SEWER-ROD EQUIPMENT CO.

9059 Venice Blvd., Los Angeles, California

855 Board of Trade Bldg. Chicago 4, Ill.
1624 Harmon Place Minneapolis 3, Minn.
401 Broadway New York 13
29 Cerdan Ave. Roslindale 31, Mass.
147 Hillside Ter. Irvington, N. J.
P. O. Box 694 Pittsburgh
Lancaster, Texas
41 Greenway St. Hamden, Conn.
P. O. Box 165
P. O. Box 447 Atlanta

Portable Power for Maintenance

VIRGINIA'S Department of Highways uses two types of Katolight electric-power plant: a 1,500-watt model with a 4½-hp gasoline engine, and a 1,000-watt with a 2½-hp gasoline engine, both manufactured by the Kato Engineering Co., Mankato, Minn. These small lighting plants furnish energy for lights, electric drills, electric grinders, and other power tools. They are carried in the trucks of mechanics who travel throughout the various counties in the state making repairs on highway equipment. Where there is no electric current and the needs do not exceed 1,000 or 1,500 watts, these plants are very satisfactory, says Charles B. Leech, Jr., Equipment Engineer of the Virginia Department of Highways.

This portable 1,000-watt, 115-volt, 60-cycle Katolight Plant with a 2.4-hp gasoline engine is carried in a truck throughout Virginia by a traveling mechanic who makes repairs of its state highway equipment, providing maintenance even in the out-of-the-way regions not equipped with electricity.

These Katolight plants generate the same kind of current as supplied by the city and country high lines. Consequently, standard 60-cycle A.C. appliances may be operated where there is no power line.

Now! LIFE INSURANCE EXPERTS PROVE THAT FORD TRUCKS LAST *up to* 19.6% LONGER

FOR THE first time in history, the scientific methods used by life insurance companies in computing rates have been put to work in figuring out life-expectancy tables for Ford Trucks.

4,967,000 Trucks Studied . . .

Wolfe, Corcoran and Linder, leading New York life insurance actuaries, assembled the records of all trucks of the five sales leaders registered from 1933 through 1941 . . . 4,967,000 trucks in all. Then they prepared *truck* life-expectancy tables in exactly the same way that they prepare *human* life-expectancy tables for life insurance companies.

Ford Trucks On Top!

The result? Ford Trucks Last Longer! Up to 19.6% longer than the other 4 sales leaders! Why is this true? Because Ford Trucks are *built* stronger. They're *built* to last longer! That extra life that's put into Ford Trucks comes from Ford experience in building *more* trucks than any other manufacturer. Ford knows *how* to build trucks that last longer!

See your Ford Dealer today. See the life-expectancy charts. You'll see why it'll pay you to place your order for a Ford . . . the truck that lasts longer!

Certified Proof

What Longer Truck Life Means to You . . .

Why It Pays to Wait for a New Ford Truck!

It stands to reason the longer you use a truck, the less it costs to own. That's why longer-lived Ford Trucks are the top truck value. And, logically, Ford longevity means lower maintenance costs . . . less time in the shop. It means more unused miles when you're ready to trade, and a better trade-in. Yes, any way you look at it, you'll get more truck for your money with a Ford Truck . . . because Ford Trucks last longer!

FORD TRUCKS LAST LONGER!

The life expectancy of a Ford Truck is:

13.1% longer than that of Truck "B"
3.2% longer than that of Truck "C"
7.6% longer than that of Truck "D"
19.6% longer than that of Truck "E"

OFFICIAL ACTUARIAL CERTIFICATE

Based on the application of sound and accepted actuarial methods to the actual experience as measured by truck registrations, we hereby certify that, in our opinion, the accompanying table fairly presents the relative life-expectancy of the trucks involved.

WOLFE, CORCORAN AND LINDER
Life Insurance Actuaries, New York, N. Y.

A Municipal Flame Thrower

Flame throwers aren't strictly army weapons. Here is a flame-gun that may be used by municipalties for many purposes, in the street, water, and service departments.

With a flat flame of 2,000° F., the Smith flame-gun, with a 4-gallon heavy all-welded fuel and air tank, yields a

The Smith flame-gun.

controlled flame that may be utilized to destroy weeds, brush, and grass; to thaw frozen pipes or to remove quickly ice, snow, and sleet; for preheating in construction work, and for disinfection.

The complete apparatus weighly only 17 pounds and is completely portable and operatable by one man. Kerosene, range oil, stove oil, or light furnace oil may be used. The average oil consumption is one gallon per hour.

Illustrated literature may be obtained from the manufacturers, D. B. Smith & Co., Utica, N. Y.

Hardinge Changes Pacific Office

The Hardinge Co., Inc., York, Pa. has changed its San Francisco district office from 94 Natoma St. to 24 California St., San Francisco 11.

The company specializes in the manufacture of grinding mills, rotary dryers, kilns, coolers, feeders, thickeners, agitators, sand filters, and classifiers for the sanitation field.

CIO Defeated at Armco

The CIO Steelworkers were defeated for the twelfth time by a vote of more than two to one recently by the Armco Employes Independent Federation of the two plants of The American Rolling Mills Co., Middletown, Ohio. The election was held under the supervision of John C. Getreu, field examiner for the Cincinnati National Labor Relations Board office.

San Francisco Gets Buses

Visitors to the San Francisco twin conventions will see something new which has been added recently to the streets of San Francisco—44-passenger motor coaches replacing the cable cars.

Previously, it had been thought that the steep grades of the streets in San Francisco would obviate the possibility of using anything but cable cars. However, the coaches manufactured by the Twin Coach Co., Kent, Ohio, proved, during demonstrations, that they would perform satisfactorily.

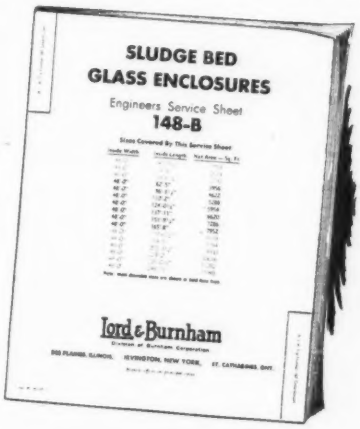
The coaches are equipped with four-wheel air brakes, electrically controlled wheel sanders, and automatic transmission that eliminates gear shifting. They also have additional retarding power for going down hill from compression braking in the dual engines, which are made by Twin Coach's subsidiary, Fageol Products Co.

Adamson New Advertising Manager for Barber-Greene

Wayne D. Adamson has been appointed Advertising Manager of the Barber-Greene Co., Aurora, Ill. Mr. Adamson, who was formerly editor of several publications published by the Illinois Institute of Technology, is replacing John H. Dykstra.

GLASS COVERS for SEWAGE TREATMENT PLANTS

Sludge Beds, Sprinkling Filters, Tanks or Wherever a Glass Cover is Needed.



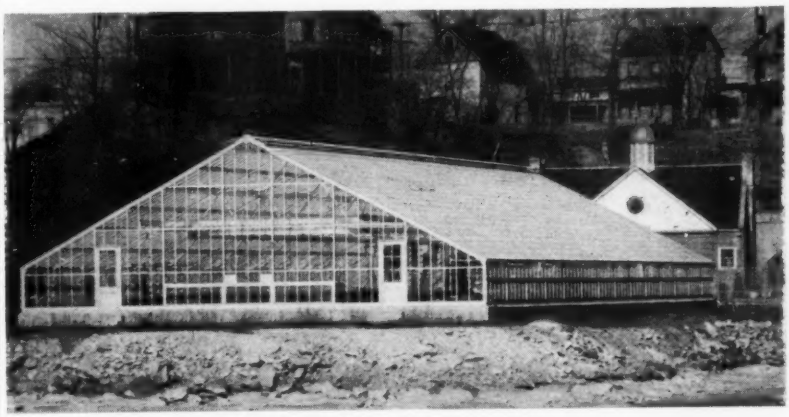
Again Available — Engineers Service Sheets

Set of six Service Sheets furnished on request. Contain details, specification and recommendations to suit individual job requirements.

Lord & Burnham

DIVISION OF BURNHAM CORPORATION

IRVINGTON, N. Y. DES PLAINES, ILL.



Sludge Bed Cover—Size 60' by 110' North Tarrytown Sewage Treatment Plant On the Hudson River at North Tarrytown, N. Y.

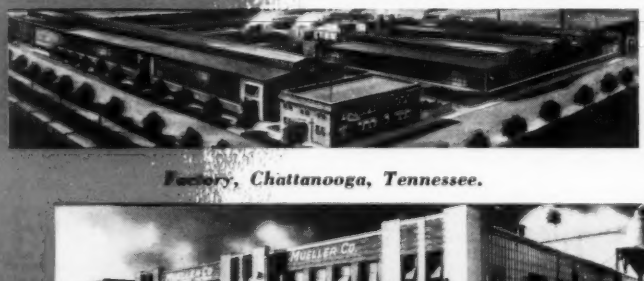
It Was
90 YEARS AGO

Where Mueller Business Started in 1857

in a small building in Decatur, Illinois, that Hieronymus Mueller established the basic principles of Mueller Co—practical design, superior quality and fine workmanship. That these tenants were sound is evidenced by Mueller Co.'s leadership in the Water, Gas and Plumbing Industries where four large modern factories and other strategically placed sales offices now offer unsurpassed service to the trade.

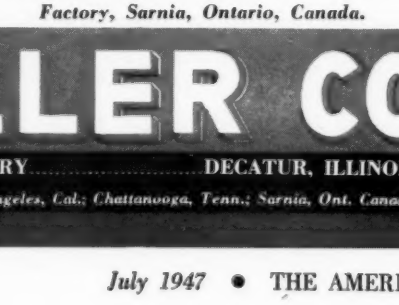
- Tapping and Drilling Machines
- Tapping Sleeves and Valves
- Corporation Stops
- Branch Connections & Gooseneks
- Curb Stops
- Service Boxes
- Service Clamps
- Tools & Equipment
- Meter Box Covers and Yokes
- Copper Service Pipe & Fittings
- Fire Hydrants & Gate Valves
- Water Control Equipment
- Line Stoppers
- Regulators & Relief Valves
- Plumbing Brass Goods

Main Office and Factory, Decatur, Illinois



Factory, Chattanooga, Tennessee.

Factory, Los Angeles, California.



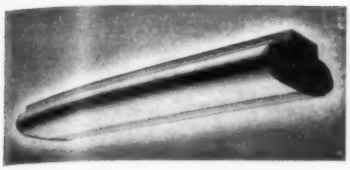
Factory, Sarnia, Ontario, Canada.

DEPENDABLE SINCE 1857 FULLY WARRANTED OUR 90th YEAR

MUELLER CO.

MAIN OFFICE AND FACTORY..... DECATUR, ILLINOIS
OTHER FACTORIES: *Los Angeles, Cal.; Chattanooga, Tenn.; Sarnia, Ont. Canada*

Fully Enclosed Fluorescent Light



A new streamlined lighting unit, Surface-Attached Holoflux, has been announced by Holophane Company, Inc., 342 Madison Ave., New York 17, N. Y. This unit, with its new curved-type Controlers, eliminates glare and provides a high level of illumination. The upper refracting member spreads the light across the ceiling, supplying a luminous background for the lighting system.

Garrett Adds to Staff

The Garrett Engineering Co., Consulting Engineers, Houston, Texas, has added H. Fred Martin to its staff of engineers. He also is Vice-president of the company.

Greenhouses Cut Sludge Drying Area

Almost universally accepted in sanitary engineering design standards is the principle that sludge-drying bed areas for sewage treatment plants can be cut by half if the beds are covered with glass greenhouses. Also well recognized is the fact that if a sewage treatment plant is located close to a residential area, its use of greenhouse-covered sludge beds gives it an attractive appearance that its near neighbors appreciate.

A set of five engineering data folders covering glass-enclosed sludge beds has been issued by Lord and Burnham of Des Plaines, Ill., Irvington, N. Y., and St. Catherines, Ont., and will be furnished upon request. The sheets are identified as 130-B, 138-B, 159-B, 180-B, and 148-B.

Northrup Moves Sales Office

Northrup & Co., Inc., has moved its main sales office from 50 Church St., New York, N. Y., to its works location, Spring Valley, N. Y.

Northrup manufactures the Bond-O self-caulking pipe jointing compound.

One Company's Work During Texas City Disaster

Evidence of the volunteer services rendered by private companies during the recent Texas City disaster is the information contained in a report made by Paul E. Ryan, southwest regional manager of the Homelite Corp., Port Chester, N. Y.

Mr. Ryan informed the Red Cross, the Houston Police, Fire, Light & Power Company, and Highway Patrol of the availability of the company truck equipped with five generators and eight flood-lights plus cable, a blower, and a pump. He also informed the chief of the highway patrol that he could keep the patrol's two-way radio stations operating for men at strategic observation points with Homelite's 22D7 units.

On the Friday and Saturday nights following the disaster, Homelite's employes and mechanisms did the greatest amount of work. Friday, a bulldozer cleared a path along the water front for about a quarter of a mile, although dock warehouses were still burning. Then a truck was run in for this distance, and a generator and floodlights were dropped off the truck at successive points, lighting up the entire area in which firemen were working. This was augmented later by floodlights on top of trucks in addition to floodlights and generators on the wharves.

FWD Appoints Kansas Distributor

M. B. Salisbury Co., Inc., Topeka, Kans., has been appointed a distributor for the Four Wheel Drive Auto Co., Clintonville, Wis. Mr. Salisbury will service that portion of Kansas east of and including the counties of Republic, Cloud, Clay, Geary, Lyon, Coffey, Allen, Neosho, and Labette.

SAVE
Trees · Labor · Time
IMPERIAL XL
400 GAL
Hardie Shade Tree Sprayers provide the big capacity and high pressure to make spraying from the ground quick, thorough and economical. Many models meeting every spraying need. Write for Catalog. The Hardie Mfg. Company, Hudson, Mich., Los Angeles 11, Calif., Portland 9, Oregon. Export Dept. Detroit 26, Mich.
Canadian Office C. W. Lewis, Grimsby, Ontario.
Hardie DEPENDABLE SPRAYERS
THE ONLY SPRAYER THAT IS COMPLETELY LUBRICATED

"There Are No Two Ways About It"

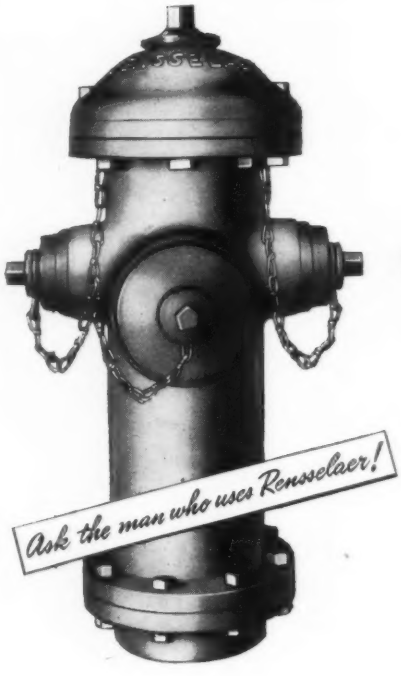
How many times have you heard this phrase?

But here's a case where there <u>are</u> two ways

. . . and two <u>good ways</u>!

THE FIRST WAY

***Install* Rensselaer gate valves to assure years of trouble-free performance.**



THE SECOND WAY

***Install* Rensselaer Defender hydrants for superior performance and faithful service.**

Experienced Field Representatives bring to you RENSSELAER'S years of research and engineering "know-how."

ATLANTA, GA.
333 Candler Bldg.

BALA-CYNWYD, PA.
725 Kenmare Road

CHICAGO, ILL.
53 West Jackson Blvd.

DENVER, COLORADO
P. O. Box 5270

HAVERHILL, MASS.
Haverhill National Bank Bldg.

HORNELL, N. Y.
38 Main St.

KANSAS CITY, MO.
1609 Oak St.

LOS ANGELES, CALIF.
Subway Terminal Bldg.

MEMPHIS, TENN.
822 Dermon Bldg.

MINNEAPOLIS, MINN.
625 Plymouth Bldg.

OKLAHOMA CITY, OKLA.
817 Braniff Bldg.

PITTSBURGH, PA.
2203 Oliver Bldg.

SAN FRANCISCO, CALIF.
115 Townsend St.

SEATTLE, WASH.
1252 First Ave., South

WACO, TEXAS
206 Franklin Ave.

RENSSELAER VALVE CO.

TROY, N. Y.

New One-Man Electric Chain Saw

A new one-man, high-cycle, electric chain saw is announced by the Homelite Corp., Port Chester, N. Y. Weighing only 27 pounds, it is used for felling and bucking trees or for cutting timber up to 20 inches. It may be used for cuts on any angle, and its small size and light weight permit this saw to be used in a tree for limbing—or in other locations inacessible to bulkier or heavier saws.

The electric power for the saw is furnished by a portable Homelite high-cycle generator driven by an integral gasoline engine.

CITY SURVEYS

- ★ Water Dept. Operations
- ★ Street Light Operations
- ★ Budgetary Control & Forecasting
- ★ Hospital Facilities
- ★ Financial, Fiscal & Economic
- ★ Fire Dept. and Hydrants
- ★ Tax Rates, Appraisals & Evaluations
- ★ School District Economies
- ★ Transportation
- ★ Street Traffic and Parking
- ★ Garbage Disposal
- ★ Municipal Zoning & Planning
- ★ Civil Service & Personnel
- ★ Special Projects
- ★ Utility Rates

Over 20 years' service

C. T. Gilliam & Associates
6311 No. Figueroa St.
Los Angeles 42 Albany 4545

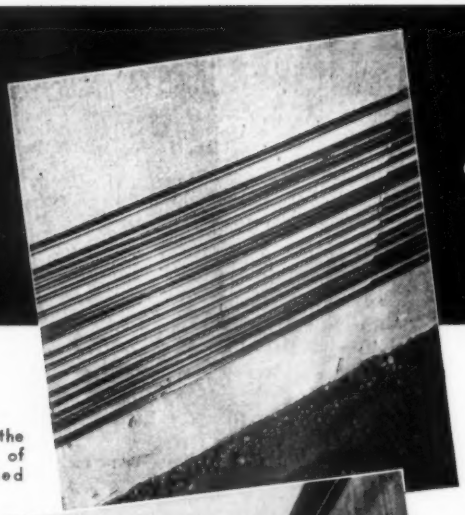
Thousands of contractors have switched to Blaw-Knox Steel Forms, and find they get a high dollar return on their investment. Whether the job is city street, curb and gutter or sidewalk—it can be done quicker and cheaper with standard Blaw-Knox form set-ups.

Easy to handle in both placement and removal. Too, the steel imparts a smooth finish to the concrete, eliminating the hand-finishing necessary when expensive wood forms are tediously built for each job. These forms are always ready for action—to use again and again . . . For illustrated data on the complete line, write today for Catalog No. 1859.

BLAW-KNOX DIVISION
of Blaw-Knox Company
2102 Farmers Bank Building
Pittsburgh 22, Pa.

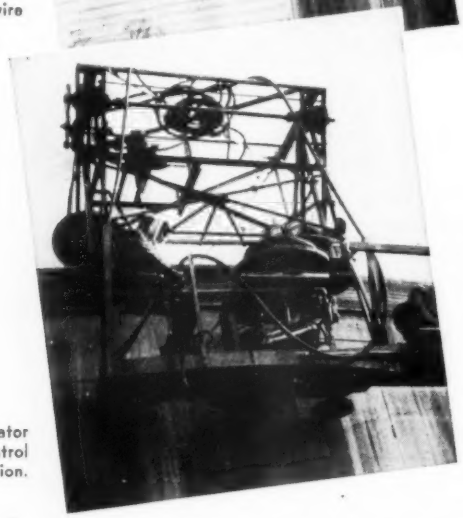
BLAW-KNOX CONSTRUCTION EQUIPMENT

Prestressed TANKS



A section of the first few turns of the prestressed wire in place.

Preloader prestressing high tensile strength wire on dome ring.



Preloader operator maintains control over wire tension.

THIRTY-FIVE MILES OF "PIANO" WIRE BALANCES THE LOAD ON TYPICAL WATER STORAGE TANK

Wire Prestressing with the automatic PRELOADER is being used on the 1,000,000 gallon water storage tank illustrated above and built for the U. S. Army Engineers at the Middleton, Pa., Air Depot by the Preload Corporation.

For a permanent army installation this prestressed tank illustrates a type of water storage which can virtually be "built and forgotten," as it will not require painting and will have little or no maintenance cost.

PRELOAD WIRE PRESTRESSING is a machine job making other methods obsolete. The wire winding machine eliminates guesswork. There is close control of the tension on the wire as it passes through the wire stressing mechanism which imposes a constant predetermined stress on the wire during application, unaffected by temperature variations during construction.

For circular tanks for water storage, filtration, or sewage disposal plants PRELOAD PRESTRESSED construction offers specific economies in original cost per gallon and substantial savings over other types of construction in concrete and steel quantities. Materials shortages do not affect construction of these tanks.. They can be built immediately, using local materials and labor. We have high tensile strength wire and vertical prestressed reinforcing rods in stock.

Write for our literature and send us your tank problem

PRELOAD ENTERPRISES INC.

420 LEXINGTON AVE., NEW YORK, N. Y.

Designers and Builders of Prestressed Concrete Storage Tanks and Pressure Pipe
Prestressed Concrete Bridges and Cement Lining of Pipe in Place

The Preload Corporation
New York—Boston—Washington

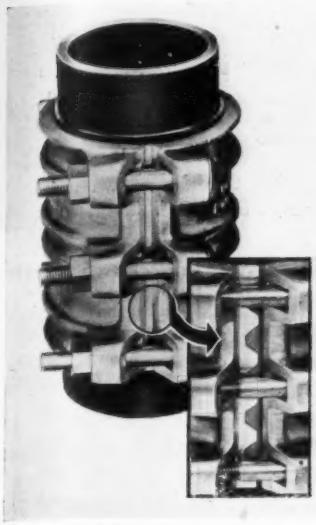
Preload Central Corporation
St. Louis—Chicago—Kansas City

PRELOAD TRADE MARK

Preload Pacific Corporation
San Francisco—Los Angeles

The Preload Co. of Canada, Ltd.
Montreal—Toronto—Halifax

Pipe Repair Clamp Installed in Six Minutes



Molded rubber gaskets with copper armor are bonded to the inside of this coupling.

The Smith-Blair Co., South San Francisco, Calif., has announced a new cast-bronze full-circle repair clamp that can be installed in six minutes and which forms a water-tight circle that compensates for the expansion and contraction of the pipe being repaired.

Installation is by means of bolting together the two halves of the coupling over the broken or split cast-iron or cement-asbestos pipe. The manufacturers claim this forms a permanent repair.

Tests conducted by the company show that the 4-inch-diameter size will hold 1,000 pounds of hydrostatic pressure.

Carter Announces Sewage Ejector

For small sewage flows, the Ralph B. Carter Pump Co., Hackensack, N. J., is now offering a pneumatic ejector, popular with sanitary engineers because of its simple rugged construction, its economy, and low requirements for maintenance, attention, and supervision.

The ejector eliminates many of the difficulties associated with centrifugal pump operation. Most centrifugal pumps have difficulty handling large solids or stringy material; consequently they require some sort of shredder or grinder to reduce this type of material to a workable size. The pneumatic ejector, however, contains no moving parts, cannot clog, and can pass solid materials of the same size as the suction inlet.

A new bulletin, #4601, describes this addition to the Ralph B. Carter Pump Company line. The bulletin may be obtained without charge by writing to the company.

Line Up with Mark-Rite

Lightweight and simple to operate, Mark-Rite is the easy way to paint guide lines. Use it on streets, parking lots, schools and playgrounds, stadiums, swimming pools and warehouses. Aluminum construction and gravity feed assure long, trouble-free service with a minimum of maintenance, requires no air or electrical outlets.

Fully guaranteed. Immediate delivery. Write for illustrated folder and prices.

Mark-Rite UNIVERSAL MFG. & SALES COMPANY
3388 Randolph St., Huntington Park, Cal.

DEPENDABLE

TENNESSEE CORPORATION
Ferri-Floc
FERRIC SULPHATE
Atlanta, Georgia

Ferri-Floc is a superior and economical coagulant developed to provide dependable, low cost treatment of water, sewage, industrial waste and sludge conditioning. Ferri-Floc is a partially hydrated ferric sulphate—a stable, free flowing salt. Granular in shape, it can be fed through any standard dry feeding, or liquid feed equipment, and being partially hydrated, it is only mildly hygroscopic. It is easy and safe to handle, does not pass through any gummy stage when going into solution—does *not* require careful proportioning of water to salt. Ferri-Floc can be shipped in 100 pound bags or in bulk cars, and may be stored in open bins for indefinite period of time. It is most economical and dependable. For complete details, write to the Tennessee Corporation, Grant Building, Atlanta 1, Georgia.

TENNESSEE CORPORATION
Atlanta, Georgia — Lockland, Ohio

BREAK CONCRETE and TAMP BACKFILL the *Low Cost Way!*

JUNIOR MODEL T

The Ideal Machine for Cutting Trench and Tamping Backfill

HIGHLIGHTS

1. Fastest pneumatic method
2. Not a drop weight but a pneumatic controlled blow
3. Average working speed 55 blows per minute
4. Saves labor, time and dollars
5. Increases your compressor output
6. Equipped with air motor which swings the boom
7. The profitable addition to your line of equipment

This unit can be added to your truck-mounted compressor.

Write for details, information on other models and prices

RAPID PAVEMENT BREAKER MACHINES

Manufactured by

R. P. B. CORP.

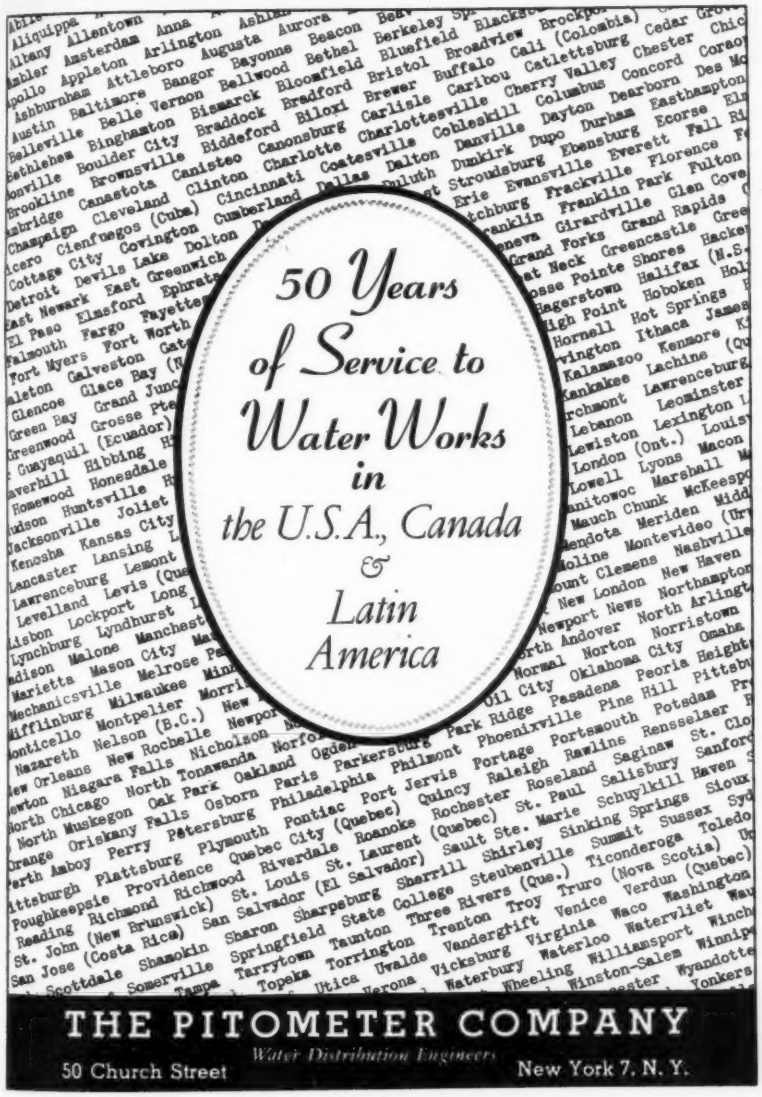
1517 Santa Fe Avenue — **Los Angeles 21, Calif.**

Making Home Life Hard for Mosquitoes

In a concerted effort to eliminate mosquitoes from the marshy surroundings along the Passaic River, the Essex & Morris County Mosquito Extermination Commissions of Morris Plains, N. J., decided on a program of eliminating the breeding place of the insect, not only because of the nuisance but also as a sanitary measure.

A dredge with a 10-inch suction pump driven by a Caterpillar Diesel D13000 engine deepens the channel (as illustrated in the photograph at the left), and thus speeds up the drainage of nearby stagnant waters, eliminating the breeding place of the mosquitoes.

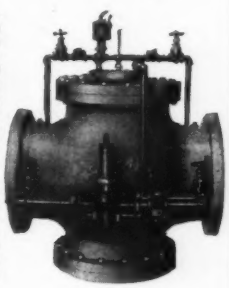
The Caterpillar Diesel is manufactured by the Caterpillar Tractor Co., Peoria, Ill.



ROSS
AUTOMATIC
VALVES

Altitude Valves for tank and reservoir, with two sets of controls — Automatic Hydraulic and Electric Remote Control. Hydraulic pilot normally operates the valve, while electric pilot is used for emergency only.

Model 40-DAWR Double Acting Valve may be operated by electric pilot regardless of elevation of water in tank or reservoir, for a break in supply or distribution and when fire pressures require direct pumpage. Model 30-AWR Single Acting Valve may be controlled in same manner.



Model 40-AWR Single Acting semi-throttling valve will close on reversal of flow and the electric pilot would serve only a single purpose — either to open wide or close as emergency may require.

Established 1879
ROSS VALVE MFG. CO.
Incorporated
P.O. BOX 596, TROY, N.Y.

WILKINSON LINE LOCATOR

Accurately Locates All Mains, Services, Valves, Stubs and the like . . . . . .

This is the new ***all-in-one*** pipe locator—carried by a single operator in one hand, leaving his other hand free to operate the controls.

95% of all underground pipe can be quickly located by one operator using this instrument ***on the single handle.***

When dismounted the two units may be operated separately.

No special parts: Uses the ordinary dry-cell batteries, obtainable everywhere.

Bulks small—weighs little, half the weight of any other inductive type locator—saves labor—expedites the job!

Write for circular.

WILKINSON PRODU TS COMPANY

P. O. Box 1774, Wilshire-LaBrea Sta. LOS ANGELES 36, CALIFORNIA

LARGE
NEW YORK CITY
(Population—7,455,000)

or

SMALL
BOLTON, CONNECTICUT
(Population—728)

BOTH COMMUNITIES HAVE FOUND THAT WITH

AUTOMATIC VOTING MACHINES

1. Voting is easier and faster
2. There are no spoiled or defective ballots
3. Absolute secrecy is maintained.
4. A mechanically accurate count is assured
5. The results are known when the polls close
6. A permanent record is obtained
7. Election expenses are reduced

If Your Community Is Interested in

A Better and Less Expensive Voting System—Write

AUTOMATIC VOTING MACHINE CORPORATION

JAMESTOWN, NEW YORK

"BUILDERS OF VOTING MACHINES SINCE 1898"

Allis-Chalmers Appointments

Top, left: William A. Roberts. Top, right: William C. Johnson. Bottom, left: Marshall L. Noel. Bottom, right: J. L. Singleton.

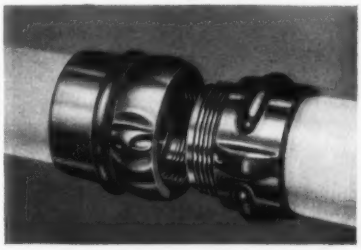
Walter Geist, president of Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., has announced the appointment of four key personnel of the various divisions of Allis-Chalmers.

William A. Roberts and William C. Johnson have been appointed executive vice-presidents of the tractor and general machinery divisions, respectively; Marshall L. Noel, Vice-president and General Sales Manager for the tractor division; J. L. Singleton, Vice-president and director of sales for the general machinery division.

Aluminum-Alloy Coupling On Goodrich Hose

A new type aluminum-alloy coupling, a set of which weighs only 2 pounds as compared with the 6-pound weight of a set of similar brass couplings, is now being offered on all the standard brand cotton rubber-lined municipal fire hose manufactured by The B. F. Goodrich Co., Akron, Ohio.

The new couplings, Type 85, are equipped with the company's Koroseal swivel washers.



Goodrich's new aluminum alloy coupling which weighs only 2 pounds.

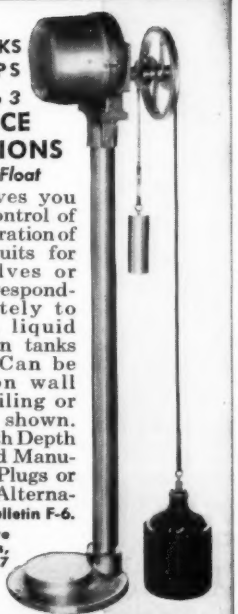
FLOATROL

For OPEN TANKS and SUMPS

Controls 1 to 3
SEQUENCE OPERATIONS
From ONE Float

Floatrol gives you automatic control of sequence operation of 1 to 3 circuits for pumps, valves or alarms, corresponding accurately to changes in liquid level in open tanks or sumps. Can be mounted on wall bracket, ceiling or pedestal as shown. Available with Depth Indicator and Manual Transfer Plugs or Automatic Alternator. **Ask for Bulletin F-6.**

For control of more than three circuits, ask for Bulletin S-7 on SELECTROL.



AUTOMATIC CONTROL Company
1015 University Ave., St. Paul 4, Minn.

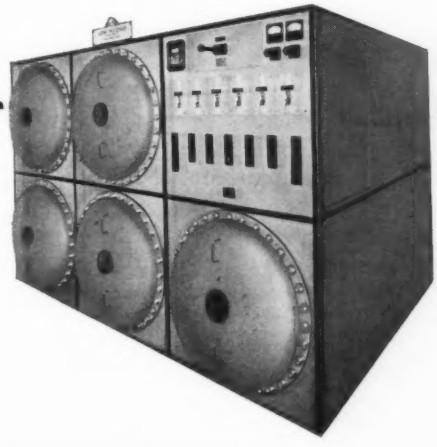
Why be bothered with

Obnoxious tastes?

OZONE MAY SOLVE YOUR PROBLEM. INVESTIGATE THE OZONE PROCESS.

A FEW FACTS TO REMEMBER ABOUT OZONE

- ▲ Ozone is active oxygen—nothing else.
- ▲ Ozone introduces no foreign, taste-producing elements.
- ▲ Ozone removes unpleasant tastes, odor and color.
- ▲ Ozone removes dissolved iron and manganese.
- ▲ Ozone precipitates algae and other plankton.
- ▲ Ozone destroys pathogenic bacteria.
- ▲ Ozone reduces the use of treatment chemicals.



It is wise to consider Ozonation in your future plans.

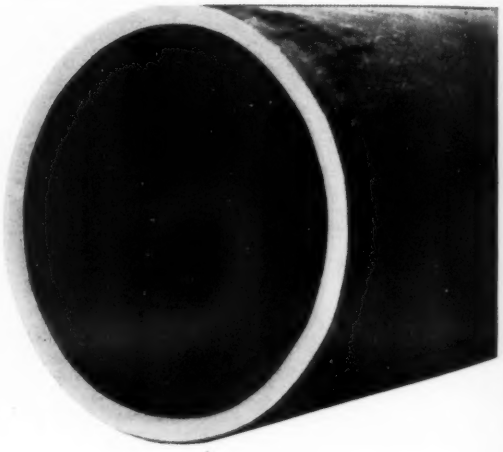
WELSBACH

OZONE PROCESSES DIVISION
THE WELSBACH CORPORATION
1500 WALNUT ST. PHILADELPHIA 2

PITTSBURGH ERIC PROCESS

Sample of Eric Process coated pipe removed from main in Liverpool, England. Note that tubercles and deposit are almost completely lacking after ten years of service.

Protects the Equity of Your Water Main Investment



CLEANS AND LINES Small Mains in Place!

Pittsburgh-Eric Process combines modern, scientific pipe cleaning methods with an ingenious process of lining water mains with bitumen. This combined service not only restores tuberculated and incrustated mains to fullest capacity . . . in addition, it lines the pipe with a protective coating that resists corrosion and adds years of service to water distribution systems.

Authorities estimate that $60,000,000 worth of pipe carrying capacity is lost annually because of tuberculation and incrustation within municipal water mains. If your community is sharing in this huge loss because of inefficient, tuberculated and incrustated water mains, it will pay you to learn more about a Pittsburgh-Eric Pipe Reconditioning Program. Just call our nearest office for the full details TODAY!

For Water Mains 3" to 24" In Diameter

An Integrated Engineering and Operating Organization Serving Communities Everywhere in the Restoration of Water Main Efficiency.

PITTSBURGH PIPE CLEANER COMPANY

133 Dahlem St., Pittsburgh 6, Pa.

PHILADELPHIA · BALTIMORE · WASHINGTON · NEW YORK · BUFFALO · CHICAGO · CINCINNATI · ST. LOUIS · DETROIT · BOSTON

Infra-red Baked Finish Steps Up Production

PHOTOGRAPH COURTESY "ELECTRIFIED INDUSTRY MAGAZINE.

Above, the Jensen "Infra-Red" installation at the Macnick plant, and, left, the finished Park-O-Meter.

One of the biggest factors making possible the production increase of Park-O-Meters, manufactured by the Macnick Div., Tulsa, Okla., has been the adoption by Macnick of a complete "dual-heat" infra-red finishing and conveyor system, designed, engineered, and built by Jensen Specialties, Inc., Detroit, Mich.

In the manufacture of Park-O-Meters, there are three aluminum castings comprising a case. An undercoat of aluminum paste and vehicle is applied, and a short drying-out time is allowed before the pieces enter the oven, which is 15 feet long, incorporating 180 lamps but using only 45 kws.

The casting is cooled, then a coat of synthetic lacquer is applied and the baking cycle repeated. The result is a finish that withstands temperature variations from 50 degrees below zero to 120 degrees above.

All the Jensen-built equipment is hung from the ceiling, permitting the use of floor space for other operations.

Folders on the Park-O-Meter may be obtained from the Macnick Division.

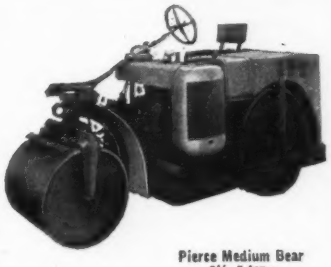
I. B. M. Appoints New Advertising Head

H. T. Rowe has been appointed Advertising Manager of International Business Machines Corp., 590 Madison Ave., New York, N. Y. Since February 1946, when he joined IBM, he has been serving as special assistant to C. A. Kirk, Executive Vice-president. He formerly was Sunday editor of the New York Herald-Tribune.

H. T. Rowe

A Roller For Every Job

Sturdy, heavy-duty rollers, engineered to stand up under the toughest conditions. Pierce-Bear Tandem Rollers are powered by economical Allis-Chalmers 4-cylinder industrial type gasoline engines. Variable weights, from 3½ to 5 tons with built-in water tanks for ballast and wet rolling.



Pierce Medium Bear
3½-5 tons

Pierce Baby Bear
2½-3 tons

The new 2½-3-ton Pierce Baby Bear is designed for close-in work and small area maintenance. It works against a curb up to 25 inches high and within 1½ inches of a higher wall or building. Final drive is within the rear roll. Use Pierce-Bear Tandem Rollers for all-around performance. Write for folder.

Pierce-Bear Rollers
Lewis Manufactuing Co.
415 Hoefgen Ave.—San Antonio 6, Tex.

★ ★

Fresh, high quality broom fibres last longer

AFRICAN BASS FIBRES

INDIA PALMYRAH STALKS

The longer mileage you obtain from fresh broom fibres means less time-taking refilling of the broom core and valuable man-hours put to an extra use. The use of fresh, high-quality fibres in your mechanical sweeper is sound economy these days.

We are able to service every need in all types and sizes. We would be happy to receive your request for samples and quotations.

MOUNTAIN HICKORY SPLINTS

STEEL WIRE SWEEPER STALKS

The OTTO GERDAU CO.

Established 1872

82 Wall Street, New York 5, N. Y.

FEEDS—METERS—MIXES
CHLORINE GAS ACCURATELY

PURIFICATION FOR WATER SEWAGE AND SWIMMING POOLS—Everson SterElators operate manually or semi-automatically, also automatically proportion gas flow to water flow.

Everson SterElators Utilize a 24" water gauge vacuum and visible flow meters, with wide ratio ranges of capacities: 10 to 1, 50 to 1, 110 to 1.

All SterElators are dependable, accurate, safe and easy to operate. Guaranteed to give complete satisfaction.

SterElators by Everson

SEE EVERSON FOR THE LAST WORD IN
SWIMMING POOL EQUIPMENT
203 W. HURON ST. CHICAGO, ILL., U. S. A.

For Real Gas-purifying Power

CONNELLY IRON SPONGE

● To get top efficiency in gas-purification at the lowest cost, use Connelly Iron Sponge. It's the finest purification material to be had.

Connelly Iron Sponge has a high degree of activity. It gives longer service before fouling. It revivifies more quickly. Leading gas companies have been using this "blue-ribbon" purification material for years—they know it can be relied upon to do the best job.

If you have a problem in gas-purification, take advantage of Connelly's 71 years of experience. Our engineers will be glad to help you . . . there is no obligation. Consult Connelly!

CONNELLY, Inc.
3154 S. California Ave. Chicago 8, Illinois
Elizabeth, N. J. Los Angeles, Calif.

CHICAGO TANK & BRIDGE COMPANY
ROCKFORD, ILLINOIS

Elevated water storage tank reconditioning; machine or sand blast cleaning; painting, repair and general maintenance of all types water storage tanks and standpipes.

Rust preventive and rust inhibitive paints used.

Personal inspection by experienced tank men and free estimate cost upon request without obligation.

ALL WORK GUARANTEED BY PERFORMANCE BONDS.

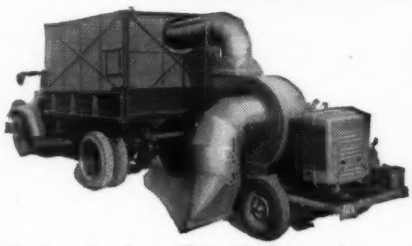
ASK THE CITIES WHO USE OUR SERVICE.

List available upon request

CHICAGO TANK & BRIDGE COMPANY
618 Empire Building Rockford, Illinois

Attention: CITY MANAGERS!

Save Time . . .
Men . . . Money
. . . and DO A
BETTER JOB



Use the VACUUM LOADER

Vacuum Loader will handle leaves (wet or dry), papers, small sticks, bits of glass, nails, etc. Also cotton, grain, etc.
This is the answer to your street sweeping problem. Loads all your curb debris and in addition takes care of your catch-basins before they fill up.

● *See your equipment dealer and if he does not handle it, write to* ●

Leaf Loader Div., AMERICAN STRUCTURAL STEEL and TANK CO.

M. A. ELLIOTTE, *Sales Manager*
928 VIRGINIA PARK DETROIT 2, MICHIGAN

Air Compressor for Sale

New Model 105 Jaeger Portable Air Compressor on Pneumatic Wheels used only thirty hours.

Petroleum Solvents Company of Pa.

Butler, Pennsylvania

Phone 5209

Woolpert Co. Enlarges Sanitary Staff

R. L. Hall has recently joined the staff of the Ralph L. Woolpert Co., Consulting Engineers, 360 W. First St., Dayton, Ohio, as part of the sanitary engineering staff headed by Myron W. Tatlock.

R. L. Hall

Mr. Hall is a graduate of Purdue University in Civil Engineering, class of 1942. He later served for four years with the Navy during the war and then returned to Purdue to receive his Master's degree in 1947.

Gaisser Elected Comptroller

John G. Gaisser has been elected comptroller of F. H. McGraw & Co., engineers and constructors, Hartford, Conn.

Storrer Opens Office

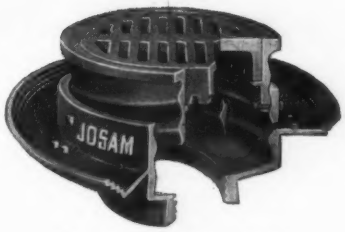
Frederick R. Storrer, Consulting Engineer, recently resigned from the position of City Engineer of Dearborn, Mich., after twenty-two years of service and has opened his own engineering office at 23919 Michigan Ave., Dearborn.

Mr. Storrer, former President of the American Public Works Association, will specialize in land improvement and land planning and general municipal work.

New Floor Drain

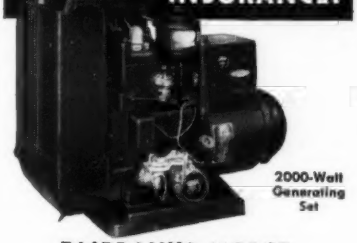
A new floor drain designed to overcome most of the problems resulting from variations in floor levels is being manufactured by the Josam Mfg. Co., 321 Ferguson Bldg., Cleveland 14, Ohio.

The Levelcze floor drain can be used where large floor areas have high—and low—floor levels. Installed with the adjustable top in neutral position permitting the top and grate to be raised or lowered to the proper level for drainage, the drain may be obtained with an extension collar to fit the body for extra thick floor finish or construction.



The Levelcze floor drain.

EMERGENCY POWER INSURANCE!



2000-Watt Generating Set

FAIRBANKS-MORSE GENERATING SETS

INSURE yourself NOW against electric power failure. These performance-proved generating sets, installed as stand-by units, will give dependable service even under continuous, heavy-duty operation. A.C. and D.C. types, remote and automatic start, 350- to 35,000-watt capacities. Send today for FREE literature!

Fairbanks-Morse

A name worth remembering

FAIRBANKS, MORSE & CO., Dept. N 7
Chicago 5, Illinois

Please send free literature on Fairbanks-Morse Generating Sets.

Name .....

Address .....

City ..... State .....

CITY WATER WORKS *Prove* BUFFALO METER *Advantages*

- FAIR METERING FOR LARGE AND SMALL USERS
- UNSURPASSED INTERCHANGEABILITY OF PARTS
- LONG TROUBLE-FREE SERVICE
- MODERATE COST

● In the large cities where purchasing has been based on value and economy, American or Niagara Meters have been ordered year after year as needs have expanded. Large numbers are used in many progressive cities including Buffalo, Cleveland, Washington, Toledo, Milwaukee, Niagara Falls, Philadelphia, and many others. No inducement other than quality and moderate price has contributed to this loyalty.

A complete range of disc meter sizes is available to meter large or small flow. Small communities, too, have found the Buffalo Meter the best investment.

Send for our impressive list of extra advantages that you will realize through Buffalo Meters.

AMERICAN BRONZE CASE

NIAGARA GALV. IRON CASE

WATER METERS

BUFFALO METER COMPANY

2902 MAIN STREET • BUFFALO 14, NEW YORK

IN MEETING TODAY'S INCREASED TRAFFIC DEMANDS

Troy, New York Motorcycle Police Use HARLEY-DAVIDSON'S Exclusively

Shown here are nine solo Harley-Davidsons used by Troy's motorcycle squadron. A Servi-Car has been added since this picture was made. Front row — left to right — Officers Henry Hayner, Jim Dwyer, Albert Watson, William Healey, Harold McKeon, William Ryan, Harry O'Grady, Martin Burke, Fred Classens, James Flynn, and James Dwyer. Second row — Captain Burkhardt, Mayor John Ahearn, Commissioner Frank Ames, and Chief Frank Kendall. On steps—Nick Capano, the Mayor's chauffeur . . . and police mechanic Michael Opar.

THE continued use of over-age cars and trucks — carelessness on the part of too many drivers — and the ever-growing number of motor vehicle registrations — all combine to create today's greatly increased "accident potential." Traffic hazards and problems have reached a new peak — a definite challenge to every community, large or small. To meet this situation, many police departments have stepped up their traffic control programs, and even with their present equipment are setting fine records in accident prevention. However, in most instances they do not have sufficient motorcycle equipment to meet increasing demands. The way to get maximum results . . . to make the most of your manpower and modern traffic control techniques, is by adding more Harley-Davidson Police Motorcycles, Servi-Cars and sidecars. City after city *has proved* that no other method can match this motorcycle combination for solving today's increased traffic problems. Call in your Harley-Davidson dealer today and get complete information about dependable, efficient Harley-Davidson Police Motorcycles, Servi-Cars and sidecars.

HARLEY-DAVIDSON MOTOR COMPANY • Milwaukee 1, Wisconsin

HARLEY-DAVIDSON
POLICE MOTORCYCLES

1947-Model Roller in Action

The 1947-model Galion roller irons out newly-laid asphalt street. The convenient location of the operator's seat makes it easy for him to maneuver closely.

G. E. Adjusts Prices On Lamps

The following policy was adopted by the General Electric Co., Schenectady, N. Y., on June 1, according to an announcement made by M. L. Sloan, Vice-president and Manager of the Lamp Department:

"The latest wave of wage increases has so raised our material and labor costs that the Lamp Department of the General Electric Company can no longer absorb the 5% Federal excise tax on lamps that we have been absorbing since 1941. We sincerely regret that beginning June 1st, 1947, this tax will have to be paid by our customers.

"At this same time, the Lamp Department is making price adjustments on certain lamps; some being decreased where continued high demand and resulting high volume make this possible, and others being raised in price because of abnormally increased costs. However, the list prices of over 90% of our lamps including those for home and industrial use remain unchanged or are lowered," the vice-president said.

"Apart from the mentioned excise tax, the average price of General Electric lamps will, on June 1st, be 5% under our prewar prices."

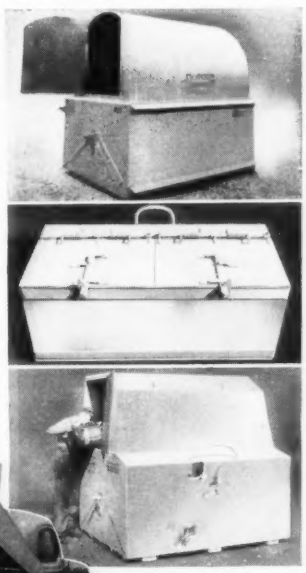
Eddy Valve Appoints District Manager

The Eddy Valve Co., subsidiary of James B. Clow & Sons, Waterford, N. Y., has appointed John T. Woodson district manager, with headquarters in Charlotte, N. C.

Mr. Woodson, in his new position, will cover the states of North and South Carolina, and Virginia south of the James River.

YOUR TOWN CAN HAVE EFFICIENT, SANITARY RUBBISH DISPOSAL

Join other progressive cities who enjoy clean, economical rubbish collection with the Dempster-Dumpster system. Detachable truck bodies—rubbish depositories—placed where needed, receive the rubbish . . . a truck hoisting unit picks them up when needed, hauls, dumps and returns them to place. Entire operation handled by truck driver. One truck hoisting unit with several bodies does the work of 4 or 5 ordinary trucks. A type of body available for every requirement. Write today for complete information.



DEMPSTER DUMPSTER
TRADE MARK REG.

DEMPSTER BROTHERS, INC.

377 SPRINGDALE AVE.
KNOXVILLE 17, TENN., U. S. A.

WITH CONSISTENT ACCURACY The Globe

GEOPHONE

Registered in U. S. Patent Office

locates Leaks without digging!

The Geophone, a device operating on the principles of seismograph and stethoscope, far surpasses any instrument ever designed for underground leak locating. When within 50 or 75 feet of a steam or water leak, the Geophone picks up the sound and within a few minutes locates the exact spot. Water departments and industrial plants using the Geophone save both time and unnecessary expense of excavations. The Geophone is also used with spectacular results in the mining, oil and termite fields.

The Geophone consists of two discs, tubes and headpiece. Outfit packed in leather covered carrying case. Handy shoulder strap.

$75

Pipe Finders $100
Dipping Needles $18.50
Pipe Phones $3.70

Globe Phone Mfg. Corp. Reading, Mass. Dept. Y

(*Manufacturers of Geophones Since* 1918)

Please send me further information on items checked below:

☐ Geophone ☐ Pipe Finders
☐ Pipe Phones ☐ Dipping Needles

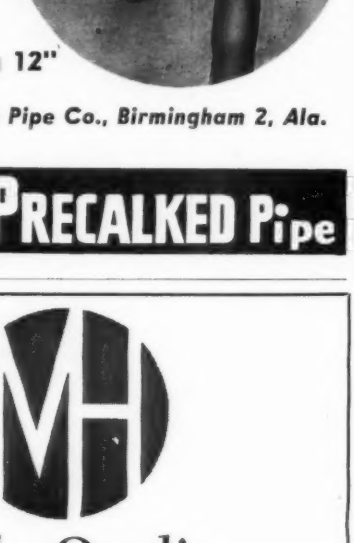
NAME .....
FIRM .....
ADDRESS .....

Easy to LAY

Saves Time

McWane PRECALKED joints are ready to use. Pure lead and redwood wedges are carefully put in the bells at the McWane plant.

"Just socket the spigot and calk"



No skilled labor necessary. A man with a hammer and a calking tool lay McWane PRECALKED Pipe as fast as the trench is dug!

All sizes, 2" thru 12"

McWane Cast Iron Pipe Co., Birmingham 2, Ala.

McWane PRECALKED Pipe

ANTHRAFILT

(Reg. U.S. Pat. Off.)

A Filter Medium For All Purposes

Has outstanding advantages over sand and quartz media:

1. Length of filter runs doubled
2. Only about one-half as much wash water required
3. Less coating, caking or balling with mud, lime, iron or manganese
4. Filters out of service less because of shorter wash cycle
5. Better removal of bacteria, micro-organic matter, taste and odor
6. Increased filter output with better quality effluent
7. Not just the top portion, but the entire bed, aids in filtering
8. Can be used in all types of filters using a filter medium
9. A perfect supporting medium for synthetic resins
10. An ideal filter medium for industrial acid and alkaline solutions
11. Decidedly advantageous for removal of fibrous material as found in swimming pool filters

Additional information, recommendations and quotations furnished upon request by

PALMER FILTER EQUIPMENT COMPANY

822 E. 8th St. Erie, Pa.

Engineers and Sales Agents

REPRESENTING —

ANTHRACITE EQUIPMENT CORP.

Anthracite Institute Bldg., Wilkes-Barre, Pa.

The "Quinn Standard"

FOR CONCRETE PIPE

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 30 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that **Quinn pipe forms and Quinn mixing formula** combine to produce the finest concrete pipe at lowest cost.

Quinn Heavy Duty Pipe Forms

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for any diameter pipe from 12 to 84 inches—tongue and groove or bell end pipe—any length.

WRITE TODAY

Complete information, prices and estimates sent on request. Also manufacturers of Quinn Concrete Pipe Machines.

QUINN WIRE & IRON WORKS 1623 12th ST. BOONE, IA.

M H

High Quality

VALVES

HYDRANTS

AND WATERWORKS ACCESSORIES

M & H products, including pipe line accessories, are well known for high quality of material and expert workmanship. They are made according to standard specifications and have been used for many years throughout the country. Write for Catalog No. 34.

M & H VALVE

AND FITTINGS COMPANY

ANNISTON, ALABAMA

PROPER HOUSE NUMBERING

ADOPTED BY MUNICIPALITIES

Premax Stamped and Embossed Metal House Numbers have been generally approved because of their extreme legibility and permanence.

Premax Products

Division Chisholm-Ryder Co., Inc., 3838 Highland Ave., Niagara Falls, N. Y.

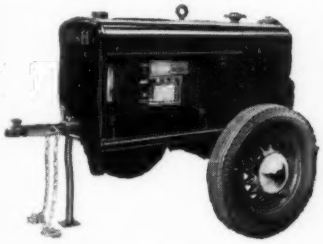
New Foam Extinguisher For Large Vehicles

This fire extinguisher has a sealed-stopper construction built into the top, preventing the chemicals from mixing until needed. Then, it just takes a twist to get the mechanism ready for action.

A new foam extinguisher which generates chemical foam equal to nearly ten times its own capacity has been announced by the American-LaFrance-Foamite Corp., Elmira, N. Y. This extinguisher is particularly adaptable for large automotive units, not only because of its large capacity, but because the chemical can stop oil and gasoline fires and prevent reflashing.

Tested to 550-pound pressure, it has a stream range of from 35 feet to 40 feet.

New Portable Welder



P&H Model WN-200 Trailer Welder

Pictured above is the new self-powered arc welder which is being manufactured by the Harnischfeger Corp., Milwaukee, Wis. This P&H Model WN-200 welder, which may be obtained as a stationary or portable unit, is an N.E.M.A. rated machine of 200 amperes, with a welding range of from 30 to 260 ampers. The unit is rated 30 volts at 2,900 rpm.

Designed for shop yard and field service, the P&H may be carried on a running gear of standard track width.

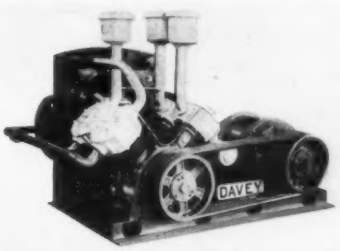
The machine comes with a 4-cylinder air-cooled engine of 26.5 hp and a 5-strand V-belt.

New Line of Air Compressors

A new line of two-stage, air-cooled industrial air compressors of 60, 105, 160, 210, and 315 c.f.m. capacities has been announced by the Davey Compressor Co., Kent, Ohio.

Featuring permanent peak efficiency valves and the new Equi-Balanced crankshaft that reputedly reduces compressor vibration to a previously unachieved minimum, the "Air Chief Industrials" are available in four types: base compressors, stationary units with base ready for installation of customer's electrical equipment, departmental compressors powered by A.C. motors, and compressors with D.C. motors.

The Equi-Balanced crankshaft eliminates heavy mounting bases.



The Model 210 Air Chief Industrial with 1,800-rpm, 220/440 volt, A. C. motor.

Here is a power mower with REAL STAMINA for hard service day in and day out; endurance such as you've never before seen in a 21-inch-cut mower. Every engine tested under full load before and after installation in the mower; fully guaranteed.

You'll get a new thrill in using it, too! Unbelievably light; weighs only 56 pounds! You can "turn on a dime," stop, cut forward or backward—all without manipulating any controls. Gets clear up to walks and walls, in under shrubbery. Breezes right through tallest, toughest, thickest grass or weeds.

Easy-starting 2½ h.p. 2 cycle gasoline engine; drives a tempered rotary blade with safety release. Patented housing draws grass erect and ejects mulchified cuttings off to one side away from operator's feet.

4 MODELS TO SUIT YOUR CITY'S VARIOUS NEEDS

In addition to the rugged Rotoflo Heavy-Duty model described above, there are two Standard models, one of 20-inch cutting width, weighing 47 lbs., and the other of 18-inch cutting width weighing 45 lbs., both using a one-horsepower 2-cycle engine. The Rotoflo Junior cuts a 16-inch swath, weighs 45 lbs., and has a twin-cylinder 2-cycle engine of ⅝ horsepower. Each Rotoflo is built to give maximum value and service for its size.

Avoid servicing grief and wasted time! Get easier, faster grass cutting and neater, healthier turf. Write for full information today!

ROTOFLO POWER MOWERS

563 Oak Street, Kansas City 6, Missouri

AIDS IN MODERN METERING

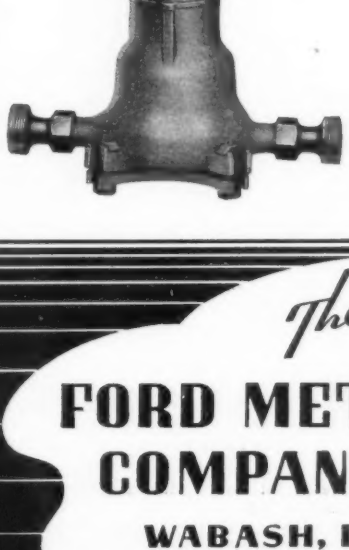
The TANDEM RESETTER permits connecting two domestic meters in series without piping changes. These useful fittings are made in three types, for basement and outside meter settings.

To compare the performance of two meters in actual service, or to convince a skeptical customer that his meter is not too fast, it is frequently desirable to connect two meters in series. The simplest way to do this is to connect the bar of a TANDEM RESETTER into the position ordinarily occupied by the meter and then connect the meters into it.

Ford Meter Idlers are ideal to connect in place of meters when they are removed. They are all brass, with accurate threads, full gasket faces and wrench flats.

Meter Idlers are made in four sizes, for ⅝ , ⅝x¾", ¾" and 1" meters.

Meter adapters screw onto meters to build them out to the same thread size and length of larger meters so that they can be easily installed where larger meters have been. Many services are over-metered, and Meter Adapters on smaller meters offer a real economy in meters as well as better registration of the smaller flows.



* * *

Our catalog tells all about these Aids in Modern Metering. Your copy sent for the asking.

The
FORD METER BOX COMPANY, INC.,
WABASH, INDIANA

"Dry Pit" Pumps

The Worthington Pump & Machinery Corp., Harrison, N. J., has introduced a new line of "dry pit" centrifugal pumps which have renewable shaft sleeve, heavy-duty ball bearings, positive grease lubrication, and a non-clogging impeller.

The line consists of seven sizes for each of three types of centrifugal pump.

The company will send line drawings, as well as the descriptive Bulletin W-317-Blo, upon request of municipal officials and consulting engineers.

Electrical Sewer Cleaner

The Flexi-Cleaner has a ½-hp motor 110 volts, 50 to 60 cycle.

The Flexi-Cleaner, an electric motor-powered sewer and pipeline cleaning machine, is portable, three-speed, reversible, and may be equipped with various cutting head tools for use with both the coiled and steel rods. The machine is manufactured by the Flexible Sewer-Rod Equipment Co., 9059 Venice Blvd., Los Angeles 34, Calif.

The manufacturers have an illustrated folder describing the machine.

General Detroit Forms Canadian Subsidiary

The General Detroit Corp., Detroit, Mich., has incorporated a new Canadian subsidiary, The General Detroit Corp., Canada, Ltd., to serve the entire Dominion of Canada.

Major Harris Popplewell

Major Harris Popplewell, who will head the new organization, was formerly associated with the Canadian National Carbon Co., and was director of sales for the Calcutta, India, branch of United Battery Distributors, Ltd. He was recently released from the First Canadian Army.

The General Detroit Corp. manufactures fire fighting equipment and apparatus.

Mickel Joins Rosen Company

Harry F. Mickel recently became associated with Raymond Rosen & Co., Philadelphia 4, Pa., in the position of engineering sales manager.

Harry F. Mickel

Previously employed with RCA Victor, Radio Corporation of America, Mr. Mickel, who is a graduate of Gettysburg College, Pa., will supervise sales of police, taxi, utilities, conservation and similar communications systems and radio marine equipment.

New Features in a Loader

The manufacturers of the 1947 Lessmann Shovel Unit, Lessmann Mfg. Co., Des Moines, Iowa, claim sixteen features for their product which they assert have never before been embodied in any loader. These features are:

- Main frame is stronger than any tractor frame ever built.
- Uprights and main frame are one solid structure.
- Fenders, hood, dash, and platform are steel plate, rather than tin.
- Dash contains all instruments to indicate exact motor performance and condition.
- Operator's compartment is fully closed in, with full floor, fenders, rest-rail, special air cushioned seat and back rest of 24-inch width, cowl over dash for protection, and a long dust apron on back of unit.
- Front grill is solid steel plate, with bumper nose built as part of upright and main frame.
- Front bolster is not cast, but has, rather, a two-solid-plate construction both front and back of axle, with non-oscillating bolster pin.
- Front axle is 2½ inches by 5 inches, solid steel. Bearing knuckle pins for easy steering. Timken wheel bearings.
- Differential heavy duty, with full floating axles; large hydraulic brakes, and drive-shaft emergency brake.
- Motor: V-8 Ford truck motor (100 hp) with special industrial radiator and air cleaner; special front power take-off to the lifting hoist; triple V-Belt drive.
- Transmission: Ford heavy-duty truck with super low and special auxiliary transmission for smooth drive and high power reserve.
- Battery is fully concealed.
- Steering: Gemmer, heavy duty.
- Speed: super low, 2 mph; low, 4.08 mph; intermediate, 18 to 20 mph; high, 30 to 35 mph. Reverse speed is 2½ mph.
- Tires: rear 13:00-24 road builders, 8 ply. Front 6:00-20 or 7:00-20 truck and bus, 8 ply.
- Load distribution: carrying load and digging strain is carried over the front axle, not 18 inches ahead of the axle as is usually done.

The manufacturers will send a folder describing the machine.

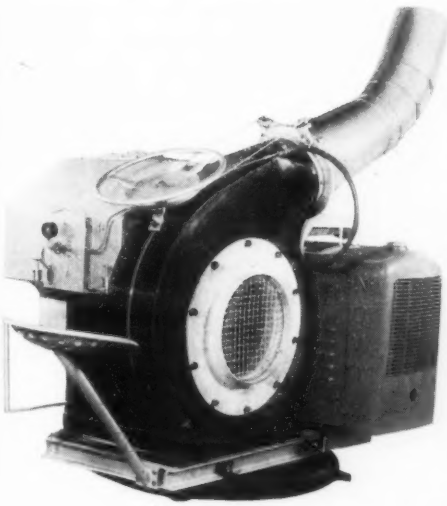
The LAWRENCE

AERO-MIST

SPRAYER

A 3-WAY INVESTMENT

FOR INSECT PEST CONTROL



Here's the new revolutionary mist sprayer that can be used by TREE, PARK and HEALTH departments for protection against defoliators, obnoxious pests and disease carrying insects. One machine for all 3 departments. Fast . . . efficient . . . economical . . . field-tested, the Lawrence Aero-Mist Sprayer projects insecticides to extreme distances in the form of a fine mist. All spray particles work in eliminating pests. Maximum pest protection at a minimum cost assured.

WRITE TODAY FOR FURTHER DETAILS, PRICES, AND FREE BULLETIN #1.

SHARE THE USE 3 WAYS—SHARE THE COST 3 WAYS

TREE DEPARTMENTS

Lawrence Aero-Mist Sprayer for the protection of shade trees and shrubs from defoliators and tree diseases.

PARK DEPARTMENTS

Lawrence Aero-Mist Sprayer for the elimination of obnoxious pests at beaches, ball parks, picnic grounds, playgrounds and public parks.

HEALTH DEPARTMENTS

Lawrence Aero-Mist Sprayer for the protection of community health from dangerous disease-carrying insects.

THE LAWRENCE AERO-MIST SPRAYER COMPANY

58 Federal St., Greenfield, Mass.

TO KEEP YOUR TOWN OR CITY CLEAN

There's Nothing Finer Than GUNNISON Motor-Driven Trailer-Type Street Flushers and Sprinklers

Clean streets and lanes are marks of a modern municipality. Even more important—public health requires that city streets be well cleaned.

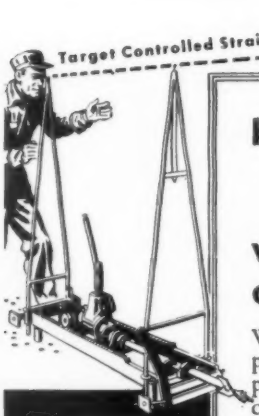
Municipalities will find the Gunnison motor-driven, trailer-type flushers and sprinklers the most economical and effective units for keeping their streets in first-class shape. These units are trailer-mounted. They are ready for use at a moment's notice, but when not in use they do not tie up any investment in truck equipment. Because of their extreme maneuverability, they are particularly useful in confined areas and for sharp turns.

A Gunnison street flusher and sprinkler recently delivered. With small extra equipment, this unit also serves as auxiliary fire-fighting equipment.

Gunnison trailer-type street flushers and sprinklers are built to operate under the most rigorous conditions. From tank to axle, strength and quality are built into Gunnison equipment. This ensures extra long life to users of Gunnison street flushers and sprinklers.

For full details and early delivery date, write us today

GUNNISON MANUFACTURING COMPANY
BARABOO, WISCONSIN



DESIGNED ESPECIALLY FOR ONE MAN OPERATION

Operates on 90 lb. air pressure and a small stream of water

How to install PIPE with your air-compressor . . .

Why not utilize your air-compressor to do underground pipe installation? Much less costly than trenching; especially so because Hydrauger goes *under* pavement instead of *through* it! Anyone can operate the HYDRAUGER.

NEW
MODEL L-2

Bores 2" Dia. Reams 3½" and 4½" Dia. . . . makes 100' of clean, bored hole

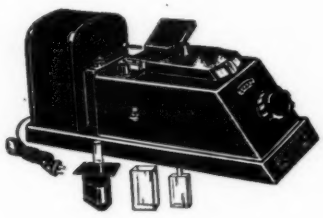
HYDRAUGER*
*Reg. U. S. Pat. Off.
EARTH BORING TOOL

Write for **CATALOG TODAY**

HYDRAUGER CORPORATION, LTD.
116 New Montgomery St., San Francisco, Calif.

KLETT SUMMERSON
ELECTRIC PHOTOMETER

Adaptable for Use in Water Analysis



Can be used for any determination in which color or turbidity can be developed in proportion to substance to be determined.

KLETT MANUFACTURING CO.
179 East 87th Street **New York, N. Y.**

Byron Jackson Builds New Plant

The Pump Division of the Byron Jackson Co., P. O. Box 2017 Terminal Annex, Los Angeles, Calif., has recently completed and is now occupying a new plant addition which covers eight acres on the south side of Vernon Ave., Vernon, Calif.

Comprised of an administration building, machine shops, stock room and warehouse, shop cafeteria, service and pattern shops, truck shed, garage and maintenance, and oil and paint storage facilities, the new unit was erected at a cost of over $1,500,000.

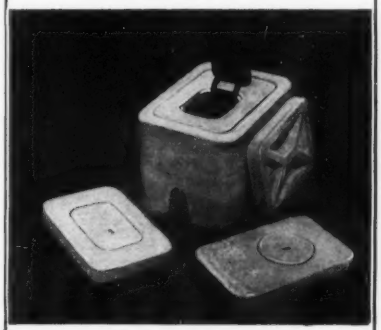
New Prong Binders

Two new prong-type binders have just been announced by the Systems Division of Remington Rand Inc., 315 Fourth Ave., New York 10, N. Y.

The books open flat and sheets can be changed easily. In addition, the new binders hold more pages than ring binders. For example 2 inches of sheets can be held in a prong binder as compared to a maximum one-and-two-thirds in a two-inch ring binder.

For further information, write to Systems and Methods Department of Remington Rand.

A.W.W.A. WELCOME TO CALIFORNIA



ART CONCRETE METER BOXES

Many Sizes and Styles
2,500,000 in Use Coast to Coast

Illustrated above is Meter Box No. 36 for ¾" meter and shut off valve with self-closing hinged iron reading lid. Alternative styles of reinforced concrete covers and lids are also shown.

ART CONCRETE WORKS

Seven Factories to Serve You
PASADENA, CALIF.
Oakland, Calif. Birmingham, Ala.
Jacksonville, Fla. Hollywood, Fla.
Portland, Ore Olympia, Wash.

Whether you're BUSTING concrete DIGGING thru shale and hardpan or TAMPING backfill—

SYNTRON

Gasoline Hammer

PAVING BREAKERS

Will Save You Money And Time

100% self-contained—no air compressor to tow around—no battery box or cable to fuss with—just stow it in your service truck and it's always ready for immediate use.

It will help your crews do those tough jobs easier and faster.

Investigate its advantages—

Write for illustrated folder.

SYNTRON CO.

430 LEXINGTON HOMER CITY, PA.

CIRCUL-AIR FIRE HOSE DRYER

WRITE FOR BOOKLET

Illustrates how Circul-Air saves hose, shortens drying time, prevents mildew and rot, air conditions as it dries, improves station design.

THE CIRCUL-AIR CORPORATION
575 E. Milwaukee Street
DETROIT 2 MICHIGAN

KARPARK

BUILT FOR THE JOB

Tiny against the towering side of the ocean liner, but built for sheer power, the sturdy tug safely pulls thousands of tons into port. Because it's built that way — rugged, strong and precise — the KARPARK keeps steadily on the go in spite of heat, cold, wind or rain. That's why a KARPARK meter parking system can be depended on to reach its objective, its port; bringing to a city smooth traffic flow, easy enforcement, steady revenue. Know all the unusual details about the KARPARK, the reasons for its outstanding results. Write now

KARPARKS ARE MANUFACTURED BY THE HERSCHEDE HALL CLOCK CO.

THE WISE CHOICE

KARPARK *Automatics*

KARPARK CORPORATION, CINCINNATI 6, OHIO

FOUNTAINS THAT HAVE I. F.

Playful "vandals" make it absolutely necessary for Outdoor Water Service equipment to have "I. F."—the stuff that enables them to stand up under the hardest kind of daily service.

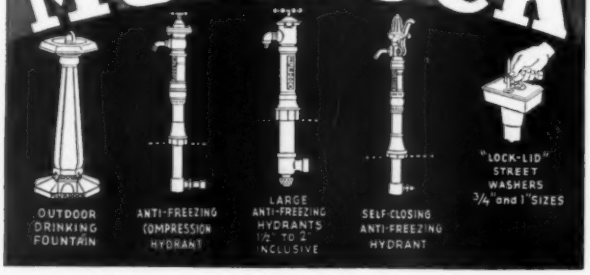
We put I. F. (guts) into MURDOCK Drinking Fountains and Hydrants.

They last for years. Seldom need repairs and then only replacement of washer.

"It Pays to buy MURDOCK".

The Murdock Mfg. & Sup. Co.
Cincinnati 2, Ohio

MURDOCK


OUTDOOR DRINKING FOUNTAIN
ANTI-FREEZING COMPRESSION HYDRANT
LARGE ANTI-FREEZING HYDRANTS 1½" TO 2" INCLUSIVE
SELF-CLOSING ANTI-FREEZING HYDRANT
"LOCK-LID" STREET WASHERS ¾" and 1" SIZES

FOR STOPPING LEAKS IN PIPE LINES...

Emergency Pipe Clamp—the universal repair clamp the world over, for nearly half a century! Easy to apply. Saves cost of new pipe—eliminates job of tearing out old and putting in new.

M. B. SKINNER CO.
SOUTH BEND 21, INDIANA

SKINNER-SEAL EMERGENCY PIPE CLAMPS

⅝ *Cu. Yd.*

8' *Lift*

FRONT END LOADERS
for Industrial Tractors

Elkhart **White Mfg. Co.** Indiana

Peterson Becomes District Manager

R. E. Peterson was recently transferred from the position of assistant manager of the Washington, D. C., branch of the Line Material Co., Milwaukee 1, Wis., to the position of district manager in the Philadelphia territory.

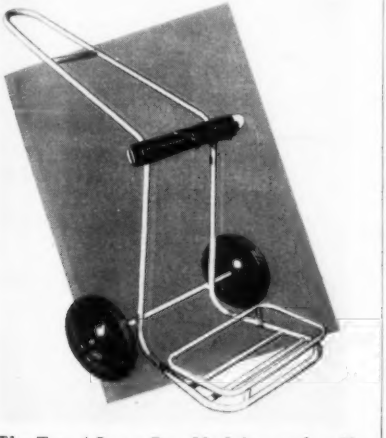
R. E. Peterson

Mr. Peterson, who is an electrical engineering graduate of Illinois Institute of Technology, was previously engaged in radar development and adaptation for the Naval Research Laboratory at Washington, D. C.

New Revenue for Municipal Golf

Municipal recreation is an expensive necessity, fees and charges pay only 6½% of the annual operating cost. Taxes pay 88% of the running cost. Hence the more paying citizens that can be attracted, the less will be the drain on the taxpayer.

Though tenth in point of participants, golf towers above other recreations as an income-producer and is one of the few that more than pays its own way. The war slowed the game, and shortages are still encountered. Among these is the scarcity and the high cost of caddies.



The Tag-A-Long Pro Model rental golf cart. This newest addition to the National Cart Corporation's line of rental and folding golf carts can handle from one to four golf bags at a single loading.

The price of a caddy has reached a point where it is usually more than the greens fee. This has had several harmful effects on both the players and the game. Fewer women come out on weekdays, when their husbands are not there to pay the caddy. And most women avoid the muscular development which comes from carrying a dead weight up hill and down dale for four or five miles. As golfing paraphernalia grew heavier, it seemed that the caddies grew smaller. The sight of a miniature caddy developing a permanent starboard list was enough to disturb all but the most hardened devotees.

A solution has appeared in the form of a golf cart to carry the leather bag, and accessories—the works, so to speak. According to National Cart Corporation, the revenue from cart rentals this year will be tremendous. The average cart that tags along after the average golfer week in and week out pays for itself and then pays a steady profit to the municipal course for the rest of its life.

Until the golf cart can say, "Not that one, mister. You can make it easy with a five iron," we don't expect the caddy to be supplanted. But by laying in a stock of golf carts, either the single-bag kind or the multiple model, a municipal course can supply enough transportation even on the busiest Sunday. Wilson Sporting Goods Co., Chicago, are the exclusive distributors of Tag-A-Long golf carts. Inquiries concerning the carts should be addressed to the National Cart Corp., Pasadena, Calif.

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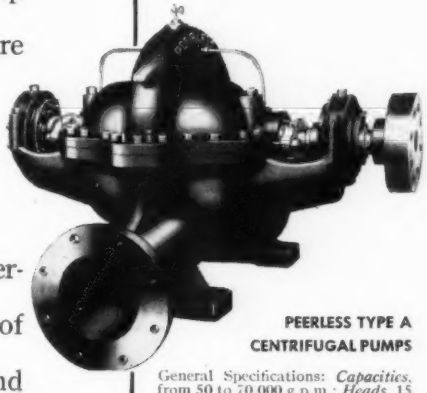

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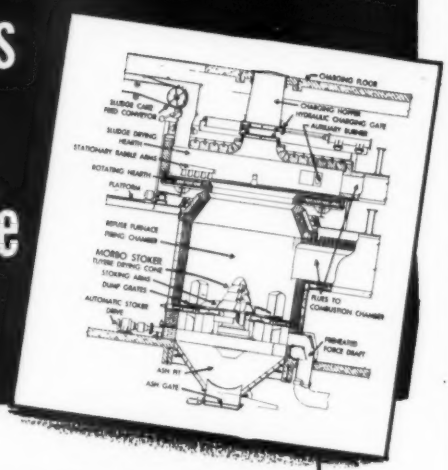

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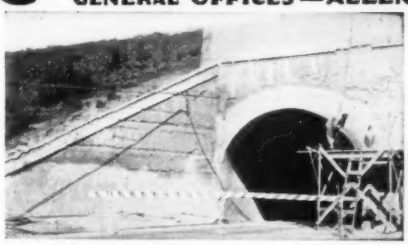

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